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EDITORIAL.

THE VETERINARY AMENDMENT OF THE ARMY REORGANIZATION BILL.

In its session of May 4th, the Senate passed the Army Reorganization Bill, and with it Senator Kenney's amendment, creating a Veterinary Corps in the Army. The amendment was discussed at length, but was finally adopted by a vote of 25–23. It was favored by Senators Kenney, Wolcott, and Gallinger, all of whom emphasized the necessity of the corps, Mr. Wolcott calling attention to the veterinary corps, with officers of high rank, in the European armies, and paying a high tribute to the men who had made a study of caring for dumb animals. Mr. Cockrell opposed the corps as unnecessary, while Senator Sewell said that the captains of cavalry were men thoroughly familiar with the diseases of the horse. Senator Lodge thought it was a great mistake to create a civilian corps with simply a multiplication of civilian officers, and Senator Proctor read a letter from the Secretary of War opposing the amendment. Mr. Kenney said, however, that the amendment was approved by all the prominent officers of the army, including the Major-General Commanding. Mr. Gallinger said it was important that educated men should be in the army to care for the animals, and thought the amendment ought to be adopted in justice to a class of educated, professional men. These veterinarians, he said, could be swept aside no longer as merely "horse doctors." He would esteem it a privilege, he said, to vote for the amendment.

As agreed to, the amendment reads as follows:

That the veterinary corps shall consist of a chief veterinarian, with the rank, pay, and allowances of a colonel, United States army; an assistant chief veterinarian, with the rank, pay, and allowances of a major, United States army, to be promoted in 1905, after competitive satisfactory examination, from the grade of veterinarian and captain; four veterinarians, with the rank, pay, and allowances of a captain of cavalry, to be promoted in 1903, after competitive satisfactory examination, from the grade of assistant veterinarian and first lieutenant; ten assistant veterinarians, with the rank, pay, and allowances of a first lieutenant of cavalry, to be promoted, after satisfactory examination, from the grade of assistant veterinarian and second lieutenant after one year's service in this grade; twenty assistant veterinarians, with the rank, pay, and allowances of a second lieutenant of cavalry, to be appointed after satisfactory examination: Provided, That these twenty positions shall include the veterinarians, first class, provided for in the act of March 2, 1899, who have passed satisfactory examinations, and also the six veterinarians, second class, who are now employed in the army under said act of March 2, 1899. All rules and regulations governing the veterinary corps shall be made by the Secretary of War, and the chief veterinarian shall report directly to that officer. For pay of officers of the veterinary corps, $33,500.

While the success of this veterinary amendment is highly gratifying and pleasing to the profession, we must consider the efforts which will be made in the House of Representatives by our adversaries to defeat or cripple this amendment. Such action is indicated by the language of the following part of an editorial in the *Army and Navy Journal* of May 15th:

The section of the reorganization bill which provides for a corps of veterinary surgeons, which was incorporated in the original bill by the Senate will certainly operate to the detriment of the entire measure when it comes before the House. This section was adopted by one of the sharpest pieces of lobby work which has ever been known. Every member of the Senate Committee on Military Affairs reported against the section, and it was not favorably considered by the Secretary of War or any officer in the War Department. There is no doubt that the cutting out of this section will be one of the first changes made by the House Committee.

Thus it was that at the hearing of the Military Committee of the House, on May 15, the Secretary of War said with reference to a corps of veterinary surgeons that he was very much opposed to establishing another bureau of the War Department of this or of any other nature. Veterinarians were needed, but they should be under the control of the Adjutant-General's

office and should not be a separate corps or department of the army. The following amendment to the Senate Bill relative to this point was submitted by the Secretary: "That the President is authorized to appoint by and with the advice and consent of the Senate, after such examinations, under such regulations prescribed by the Secretary of War, two veterinaries for each cavalry regiment and one for each battery of field artillery in the service, provided that said veterinaries shall have the rank of second lieutenants of cavalry without command, and provided that two veterinaries of the first class now in the service shall be appointed without further examination, and the veterinaries of the second class now in the service shall be assigned to duty under direction of the Secretary of War, and, upon separation from the service of the present incumbent, no more of the second class provided for under the act of March 2, 1899, shall be appointed."

This amendment seemed to be accepted with favor by the members of the House Committee, and will probably be incorporated in the bill as reported by that committee.

While it will be seen from the above that the Secretary of War is not altogether opposed to a change, we fully realize the difficulties with which our friends in Washington are battling for the good of the profession, and we shall not be unmindful of their endeavors, and only hope that further and full success may crown their efforts. O. S.

THE FUTURE OF THE VETERINARY PRACTITIONER.

During the past few years of commercial depression in this country the value of horses became so reduced as to render medical attendance upon them when sick or disabled a questionable economic problem, and the status of the veterinarian from a financial point of view was very discouraging—so much so that many abandoned the practice of the profession and sought employment in other fields. The introduction of other

modes of transit (especially the bicycle) became an easy matter, as the public was earnestly seeking to curtail expenses, and readily grasped the explanation for giving up the maintenance of horses by putting forth the fictitious love of outdoor exercise as afforded by the health-giving bicycle, quoting eminent medical authority in support of their contention. When following this came the stock-jobbing automobile syndicates, with glowing statements of prospective business that would have done credit to the late Col. Sellers, the yellow journals rushed to the conclusion that the horseless age was upon us, and illustrated their faith by ridiculing the horse and denouncing him as unclean and unsafe, publishing pictures of imaginary museums containing his fossil bones as a reminder of the dark days when we were in such a crude state as to have utilized him as a means of pleasure and a beast of burden.

During that period the REVIEW endeavored to take a conservative view of the situation, pointing out the elements which were conspiring to mislead the public, and showing how the noblest beast of creation, intimately associated with the history of all great events in the world's progress, was in no danger of suffering impairment of his glory in this enlightened age. His relief from burdens that were almost a sacrilege to exact from him meant nothing but a greater destiny for him. We feel, therefore, at this time, that the REVIEW is eligible to refer to these recent circumstances of history, and to draw the attention of its readers to the fact that throughout the country the appreciation of the horse was never keener than at the present time, and the demand for him is increasing with a rapidity that seriously menaces the supply. Prices are up to the boom standard, and students of the breeding situation predict that they are but in their infancy. The foreign market recently opened up to America is very encouraging, and reports credit the American horse with giving general satisfaction wherever he is sent.

This all means that the future of the veterinary practitioner is very bright, as owners of horses at prevailing prices must

see the profit of securing intelligent attendance upon their sick or disabled animals in order to restore them to usefulness. We, therefore, felicitate the profession upon the prospects that lie before it.

In a recent article published in these pages, Prof. W. L. Williams has put the subject in such a forcible manner that we here reproduce one paragraph, and commend it for its wisdom and elegance:

"Intelligence, close companionship, beauty of form and grace of motion, attainable only in living beings, guarantees a permanent place for the horse, and the passing of the lower types only enhances the value of those retained, so that the intelligent, competent horse, in field or on road, in the carriage or under the saddle, in peace or war, is as highly prized to-day in affection or gold as the Bucephalus of Alexander the Great or the chariot horses of the Olympian gods."

SOUTH AFRICAN HORSE SICKNESS.

The true etiology of this deadly equine plague that is at the present time decimating the ranks of the British cavalry and transport service in South Africa, still remains an unsolved enigma. From the reports of veterinarians and others at present in that part of the world, it appears that the disease is due to some toxic principle that emanates from the earth and settles on the grass during the night time. That there is considerable truth in this hypothesis is borne out by the fact that horses that are kept from grazing upon the prairie or "veldt" during the night and until the dew has evaporated from off the grass in the morning, usually escape the disease. Whether this lethal emanation that arises from the earth and grass is due to the presence of a specific bacteria, or to a fungus parasite similar to the *plasmodium malariæ* that causes malarial fever in man is unknown, although the opinion appears to be prevalent among investigators of this disease, that it is caused by a parasite of the protozoa class. Such parasites have been found in the blood of horses suffering from the disease, though attempts to isolate this micro-organism in a culture medium and produce the disease in healthy animals by inoculation have failed. The disease

may be produced by the intravenous injection of the blood or serum from a diseased animal.

The geographical range of the disease, which is at times quite sporadic, appears to be common to all parts of South Africa, and has been met with as far north as Massowah on the Red Sea, although it is in Cape Colony, Natal, Rhodesia and the veldt plains of the Transvaal that the disease is most common and often rages with the utmost virulence.

The disease usually makes its appearance about the middle of February, but does not reach the acme of its virulence until the latter part of March and the beginning of April. The frightful mortality list of this disease is simply appalling, often but a few hours of infection (2 to 10) being sufficient to cause the death of an apparently healthy horse. From the reports of cavalry and transport officers in the field, we learn that sometimes as high as 98 per cent. of the horses attacked in certain camps have succumbed to the disease.

The disease makes its appearance under several distinct forms: That affecting the lungs and pleuræ (*paard ziekte*); second, a phlegmonous inflammation of the head (*dikop*, or "thick head"), which often swells to an enormous extent; third, in which the tongue becomes so swollen that it cannot be retained in the mouth (blue tongue). There is also an enteric form characterized by severe abdominal pain and enteritis. During the progress of the disease there is marked venous and arterial congestion; respiration hurried, from 80 to 100 per minute; temperature ranges from 105 to 107° F. There is a profuse outpouring of mucous and serum from the bronchial tubes, and in some cases so profuse is this discharge that death from suffocation rapidly ensues. The period of incubation averages from eight to ten days. W. J. M.

THE RECENT ARMY EXAMINATIONS.

In order to fill the remaining few vacancies of veterinarians in the U. S. Cavalry, army examinations were recently held at different military posts throughout the States. The examina-

tion extended over nine days (May 2 to May 10, inclusive) and consisted of a physical examination by a board of medical officers, and of written examinations in all professional medical branches, each day occupying from six to seven hours, and finally of a practical examination in equitation.

The Board of Examiners consisted of Major Kingsbury and First Lieut. Philipps, 3d U. S. Cavalry, and Dr. Victor A. Norgaard, of the Bureau of Animal Industry. There can be no doubt that the Board had a hard task of selecting the candidates for examination out of a number of about one hundred and fifty applicants, 90 per cent. of whom were graduates from two-term schools and a number of them illiterates. As far as the examination itself is concerned, the professional questions were very fair and practical, but they covered so completely the whole range of veterinary medical knowledge, up to the latest theories and discoveries, that only a man of well-rounded education could face them with anything like success. If this is going to be the standard for future army veterinary examinations, as it evidently is, it will effectively bar out not only incompetent men, but also those of an incomplete and superficial education. Besides, it was very evident that the members of the Board were "sizing up" each candidate as to his personal character, social manners and aptitude for military service, as is done at examinations for commissions in the army.

If the army will now reciprocate by giving the future veterinarians a proper status, it will, in time and under prudent leadership, develop into a veterinary corps second to none of other countries. O. S.

ELSEWHERE will be found the first installment of an excellent contribution to our literature on the subject of "Dog Distemper," by Dr. Coleman Nockolds, of Grand Rapids, Mich. The author, while presenting no new discovery in connection with this canine plague, has collaborated the subject in such a practical and faithful manner as to render his description of the disease the clearest and most comprehensive that we have seen.

ORIGINAL ARTICLES.

TEXAS FEVER.

EXPERIMENTS MADE BY THE MISSOURI EXPERIMENT STATION AND THE MISSOURI STATE BOARD OF AGRICULTURE, IN CO-OPERATION WITH THE TEXAS EXPERIMENT STATION, IN IMMUNIZING NORTHERN BREEDING CATTLE AGAINST TEXAS FEVER FOR THE SOUTHERN TRADE.

By J. W. Connaway, Veterinarian Missouri Experiment Station, and M. Francis, Veterinarian Texas Experiment Station.

(*Continued from page 112.*)

III. EXPERIMENTS ON IMMUNIZING NORTHERN CATTLE AGAINST TEXAS FEVER BY INOCULATION WITH INFECTED BLOOD.

In the following section a report is given of the inoculation of over four hundred registered breeding cattle raised north of the Texas fever quarantine line, and shipped into infected territory in the State of Texas.

As stated in the introductory section Texas fever can be induced artificially in northern raised cattle by hypodermic injection of blood from immune southern cattle. This discovery was made by Drs. Smith and Kilbourne, in their classical investigations into the pathology of Texas fever.* In the course of these investigations it was observed that the attack induced in this artificial way "was not so fatal as the natural disease"; and the suggestion was made that by further experimentation a practical method of preventive inoculation might be perfected.

Recent experiments in Australia, where the "fever tick" is gradually spreading over the country on account of the mildness of the climate, show that preventive inoculation by means of infected blood has met with great success as a defensive measure on the cattle ranges of that country. Moreover that the method

* Bulletin No. 1 Bureau of Animal Industry and Reports of C. J. Pound, director of Queensland Stock Institute, and Dr. J. Sidney Hunt, Government Pathologist, Queensland.

is being employed in immunizing stud and range bulls intended for infected territory.

The work reported herein shows that the employment of this method as a purely commercial measure, has given fair success notwithstanding the unavoidable fatiguing effects of a long railroad journey, and the widely different climatic conditions that must be encountered by cattle shipped from northern to southern sections of this country.

In regard to the mechanical details of this work, it will be sufficient to say that the blood is taken from the jugular vein of a proper supply animal by means of a sterile canula. The vessel for collecting the blood, and all instruments that come in contact with it being sterilized, and kept sterile throughout the operation. The fibrin is removed by means of a wire whipper to keep the blood in a fluid condition. The inoculation is made by means of a properly graduated hypodermic syringe. Minute details as to sterilizing the instruments, drawing and preparing the blood, and making the injections are unnecessary; as those who are competent to carry on this work have been trained in these surgical details. Everyone who undertakes inoculation should be familiar with the pathology of this disease, for medical treatment will be necessary in some cases, and cannot be carried out intelligently without a practical knowledge of the pathological processes.

The impression prevails that inoculation against "Texas fever," is as simple and harmless as inoculation against "blackleg." On the contrary, the effects are more severe; some signs of illness are expected in all that become properly immunized and attention is necessary through the inoculation fever. Moreover, attention must be given throughout the first season of tick infestation to prevent fatal relapses especially in the older bulls.

The history of the several lots of cattle that have been inoculated is given below.

BULLOCK.—10 HEAD OF REGISTERED ABERDEEN ANGUS BULLS.

The cattle used consisted of ten Aberdeen-Angus bulls, six to ten months of age, raised near Wichita, Kansas.

The blood used was drawn from an immune cow in Brazos county, Texas. To it was added ten per cent. of saturated watery solution of tri-kresol, to lessen the danger of putrefaction. The blood was immediately forwarded to Wichita. The inoculations were made by Dr. Ward on November 19, 1897, who gave each bull 8 cc. of the blood subcutaneously. After inoculation, the bulls were kept as quiet as possible in a lot during the day and in a warm barn at night. They were fed prairie hay and a mixture of equal parts of corn chop, oats and bran. During the fever following the inoculation they showed a marked loss of flesh, but none refused food entirely. They were held in this lot for 30 days, then shipped to the Brightside ranch in Brazoria county, Texas, where they arrived December 24, 1897. They were put with southern cattle, no attempt being made to isolate them. They were grazed on oats, and fed cotton seed, and sorghum hay. On January 14, 1898, one of them died suddenly. One or two others were sick but recovered. No other sickness occurred among them during the following summer (1898), and they have grown fairly well. As to the present condition of these cattle, the manager writes: "In the spring of 1899 they were turned in with the range cattle, being at that time two years old. They have taken their chances like southern grown cattle, and have done good service and look well."

RHEA.—10 HEAD OF REGISTERED SHORTHORN BULLS AND HEIFERS.

This experiment differs from the preceding in that the inoculations with immune blood were made after the cattle had been taken south.

Lot I, consisted of four animals, two bulls about eight months old, and two heifers about 12 months old. These cattle were pure bred Shorthorns, raised near Council Grove, Kansas. They were shipped south and arrived in Collin county, Texas, in February, 1898. They received subcutaneous injections of defibrinated blood, from a cow raised in Brazos county, Texas. The bulls received 4 cc., and the heifers 8 cc. Tri-

kresol was added as in the above experiment. In eight days one of the bulls and one of the heifers refused their food, became gaunt, showed reeling gait, which continued for some days. They were eating again reasonably well by the expiration of two weeks. The other bull and other heifer which received the same dose at the same time were not apparently affected.

After twenty days the four were re-inoculated as in the first instance. The two that were sickened by the first dose were not apparently affected by the second. The other two, on the ninth day refused to eat, and were stupid for several days. On April 25th, each animal received a third inoculation of 8 cc., of defibrinated blood, but no effects were apparent from it.

Lot II, consisted of six registered Shorthorns, raised in Cooper county, Missouri, bred by W. P. Harned. They were

FIG. 5.—GROUP OF INOCULATED SHORTHORN HEIFERS, RAISED IN COOPER COUNTY, MISSOURI. HAVE PASSED TWO SEASONS IN TEXAS.

shipped to Collin county, Texas, where they arrived April 21st, 1898. The lot consisted of one bull seven months old, and five heifers from 8 to 12 months old. On April 25th, each one received 4 cc. of defibrinated blood subcutaneously. This blood, as in the former experiment, had been prepared at the Texas Experiment Station, from an immune cow. Eight days later four of the calves left their feed untouched, but no symptoms of an alarming character developed.

May 26, 1898, each calf received a second inoculation of 4 cc. defibrinated blood, subcutaneously. Eight days later they all showed a lack of relish for their food, which continued 3 or 4 days. Nothing further was noticed until September 10th, 1898, when one of the heifers of Lot I died. All of the remaining heifers produced good healthy calves in the spring of 1899, and have all passed the summer of 1899 successfully, though they have been very ticky and have perhaps suffered some from them.

GREEN.—136 HEAD OF REGISTERED SHORTHORN BULLS AND HEIFERS.

Lot I, consisted of ninety-four pure bred Shorthorns, whose ages ranged from six to twelve months. They were raised in New York, Ohio, Indiana, Illinois and Iowa, and had been bunched on the owner's farm in Coles county, Illinois.

October 15, 1898, each received 2.5 cc. of defibrinated blood subcutaneously. The blood used was from a six-year-old ox which had been raised in Southern Texas and had been brought to Illinois in September, 1898.

As neither of us could remain to make observations, most of the clinical notes have been supplied by Mrs. Dr. Green.

"October 29th (14th day). The smallest calves seem to be sick. Five or six have been stupid 2 or 3 days, and half of the bunch show symptoms of fever. The largest ones are not affected apparently."

"Nov. 2d (17th day). One of the calves died yesterday (16th day). Two are very sick; others are in various stages. Nearly all are discharging mucous from nose and mouth. They show staring coat, drawn and pinched appearance, drooping ears, panting, stiffness of the limbs, glassy eyes. In many the catarrhal symptoms, labored breathing and weakness, are severe."

"Nov. 4th (19th day). No local trace of the inoculation on any of the calves. Two of the smallest are sick. Some are getting better and some are just taking sick. The heifers seem to be less severely affected than the bulls. The most pronounced symptoms are, drooping ears, nasal discharge, which is bloody

in some cases, rapid breathing, staggering gait; loss of appetite and flesh; pinched, drawn appearance of the whole body."

Nov. 9th. Went to Oakland again to see cattle and inoculate others. The majority of the cattle are doing well, about twenty look somewhat gaunt but most of them are eating well, —one young bull refuses food and appears very sick. Inoculated 43 more calves from Iowa, that had arrived since Oct. 15th, giving each 2.5 cc. of blood taken from the mate to the ox whose blood was used Oct. 15th. Also reinoculated six of the first lot which showed no marked symptoms, using 2.5 cc. of the same blood as Lot II.

"Nov. 10th. The young bull that has been so sick died last night."

"Nov. 19th. One calf of Lot II is very sick (10th day)." Recovered.

"Nov. 28th (43d day). The sick calf of Lot I, which had a relapse (2d reaction) is about well."

"Dec. 3d (49th day). The calves are doing very well. Feeding them on corn, oats, bran and hay, and turn them into the pasture on pleasant days. The second lot have not been so sick as the first. Some of the first have had relapse (second reaction). Three of the six which were reinoculated have shown the effects of it. All are now in thriving condition except two or three of Lot I." The probable cause of the cattle of the first lot not doing as well as the second is that they were exposed to a cold rain storm about the time of the primary fever period.

Dec. 18th. Cattle shipped south.

Dec. 20th. Cattle fed at Parsons, Kansas.

Dec. 23d. Train wrecked at Marques, Texas, at midnight. One car turned over. Ten calves killed outright, and many crippled.

Dec. 24th. Cattle arrived at San Antonio, Texas, and put in yards. They appear badly fatigued and gaunt from long journey and the shake-up of the wreck. Many of them have pink-eye.

Jan. 17, 1899. Cattle have been moved to the ranch in Dimmit county. Four or five have died of blackleg. Otherwise they are doing nicely.

Aug. 23d. No losses from fever among inoculated cattle up to July 10th. Not many ticks on them until then. Since that date have lost ten which were inoculated, and ten others have been sick but have recovered. They have been fed grain and hay or cane until June 1st, when grass was so abundant that they preferred it. They were doing as well as one could wish until July 10th. One Red Polled bull which has carried ticks all spring and summer has shown no signs of fever to date.

Sep. 20th. Cattle all doing well.

Has lost about 40 per cent. of those that were not inoculated.

TOD.—LAURELES RANCH, 30 HEAD OF REGISTERED HEREFORDS.

This lot of bulls, consisting of thirty head of registered Herefords bred in Missouri and Illinois, was supplied by Capt. John Tod, manager of the Laureles Ranch, Corpus Christi, Texas. On their arrival at the Missouri Station, Nov. 1, 1898, they varied in weight from about 275 lbs. to 850 lbs. The weight of each at the beginning and end of experiment, with

FIG. 6.—GROUP OF INOCULATED HEREFORD BULLS, SIX MONTHS AFTER EXPOSURE TO INFECTION AT THE LAURELES RANCH, CORPUS CHRISTI, TEXAS.

gain or loss, are given at the head of the temperature tables, see pages 37 to 40, also in the clinical notes, pages 27 to 36.

Before inoculating the bulls, they were given a week's rest, to allow them to overcome the soreness and fatigue incident to shipment, and to adjust themselves to changes of food and surroundings.

On November 7th, fourteen head of the small and medium size bulls were inoculated, each receiving subcutaneously 2.5 cc. defibrinated blood from an immune Texas steer.* This lot of bulls, is designated in the temperature tables and clinical notes as "Group I," and consisted of animals numbered as follows: Nos. 1, 3, 2, 13, 7, 14, 17, 12, 19, 15, 26, 4, 21 and 18. Bulls Nos. 4, 21 and 18 were reinoculated Dec. 8th with 2.5 cc. of defibrinated blood from a "recovered" native.

On Nov. 15th ten head more were inoculated from the Texan steer, 2.5 cc. blood being given. In this lot was included one of the larger bulls (No. 23) weighing 680 lbs. In the temperature table and clinical notes this lot appears as Group II. The lot comprises bulls Nos. 8, 22, 20, 23, 24, 16, 10, 28, 25 and 5. All these except the first four were reinoculated Dec. 8th, dose 2.5 cc., from the recovered native.

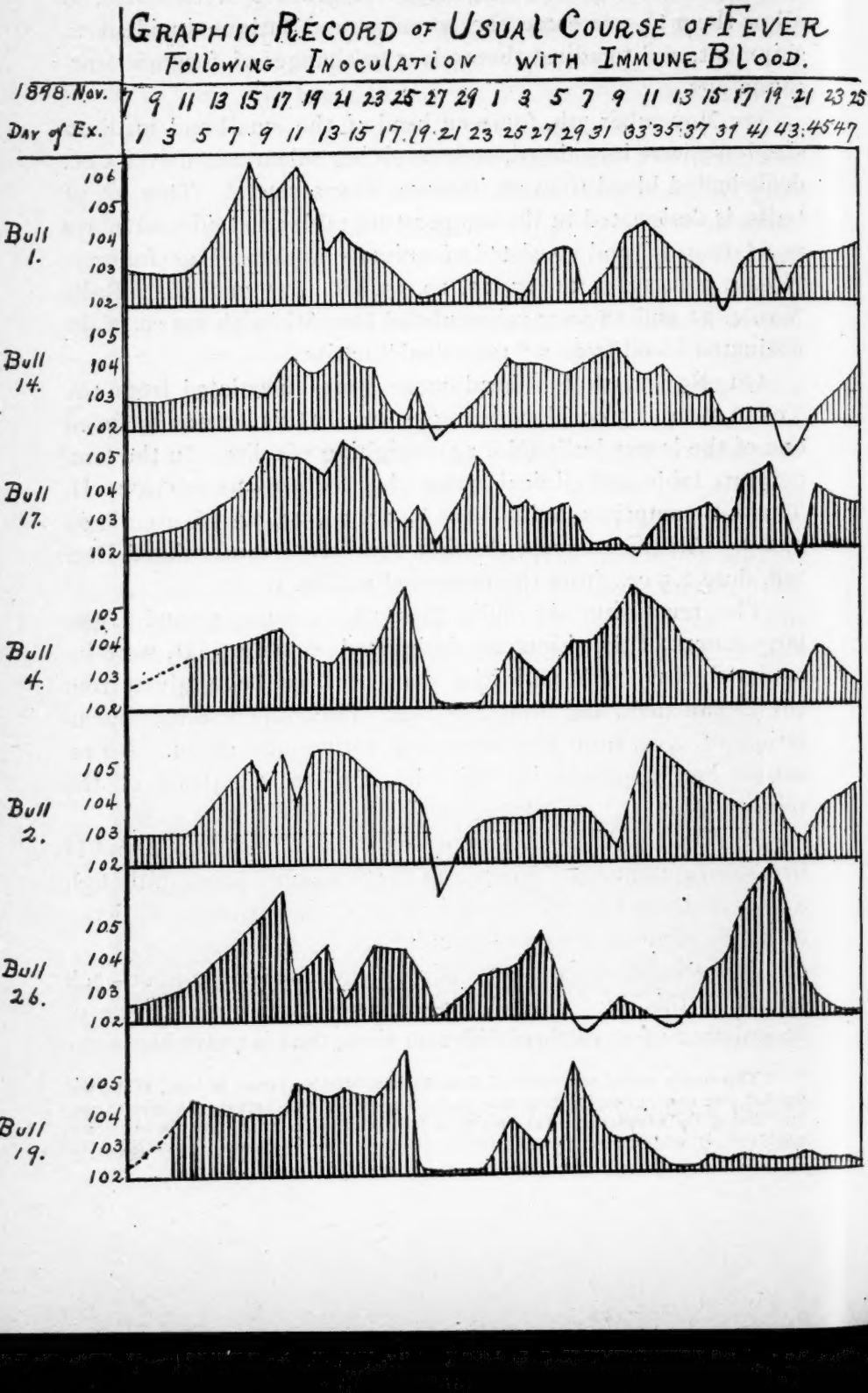
The remaining six bulls, Nos. 58, 11, 29, 9, 30 and 6, the largest ones of the shipment, designated as Group III, were inoculated Nov. 29th, an initial dose of 1 cc. being given from the Texan steer, and nine days later (Dec. 8th) a second inoculation of 2 cc. from the recovered native was given. No reaction had appeared in this lot up to the time of the reinoculation.

Most of the bulls that were reinoculated in Groups I and II had shown no marked fever from the first inoculation, although a few animals that had shown fever were reinoculated to determine the effect of a second inoculation.

Temperature records and clinical notes are given upon each animal of this lot, to supply fuller knowledge of the effects of inoculation upon cattle of different sizes, than is available in the

* This supply animal was received from College Station, Texas, in June, 1898; was one left over from "Dipping Experiments." The animal was kept on an infected pasture during the summer and was bearing a few mature ticks at the time the blood was used.

FIG. 7.


GRAPHIC RECORD OF USUAL COURSE OF FEVER
FOLLOWING INOCULATION WITH IMMUNE BLOOD.
1898. Nov. 7 9 11 13 15 17 19 21 23 25 27 29 1 3 5 7 9 11 13 15 17 19 21 23 25
Day of Ex. 1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47
Bull 1.
Bull 14.
Bull 17.
Bull 4.
Bull 2.
Bull 26.
Bull 19.
106
105
104
103
102

preceding experiments. These notes give the date of rise of fever, its duration and type, whether severe or mild, the condition of the animal when shipped and the history of the bulls after arrival in the south.

A study of the temperature records and notes shows that, as a rule, the inoculation fever begins about the 8th or 9th day after the inoculation, sometimes a little earlier and sometimes later; and that it usually continues from 7 to 8 days. In some cases it may not exceed 4 days, and in others it may be prolonged to 15 days. The daily average of the temperature during the primary fever period, counting all that reacted distinctly, was about 104.5° F.

A remarkable feature observed in this experiment was the occurrence in quite a number of animals of a distinct secondary fever period, beginning at about the 25th to 30th day after inoculation and continuing from 7 to 8 days (in a few cases 4 or 5 days and in a few from 12 to 16 days). This secondary fever as a rule was not so severe as the primary. The graphic records, page 26, illustrate this matter of the primary and secondary fever periods. In some animals that received but one inoculation, no appreciable reaction appeared at the usual period of primary fever, but came up strongly at the secondary period. These bulls were not kept under observation a sufficient length of time to determine whether a "periodicity" occurs in this fever, as in malarial (the micro-organism of which appears to be nearly related to that of Texas fever). The suggestion arises that a tertiary and succeeding recurrences of fever take place, each milder than the preceding, until finally immunity is attained.

The matter of the occurrence of the marked secondary fever period has been confirmed in experiment No. 8, carried on during the succeeding spring and summer at the Texas Experiment Station. In this later experiment five animals were used; the temperature records were taken twice daily, and in a more systematic manner than was possible in the larger group of the above experiment. In addition, regular determinations of the

decrease and increase of blood corpuscles during the experiment were made. See graphic record, page 65.

CLINICAL NOTES ON THE TOD BULLS.

Group I. Inoculated Nov. 7, 1898; dose 2.5 cc. each. Shipped to Corpus Christi, Texas, Jan. 1, 1899. Arrived at destination Jan. 6, 1899.

Bull No. 1. Weight when received 272 lbs.; gained 60 days, 38 lbs. On eighth day had high fever which continued from 105 to 106° F. for five days, with slighter fever for a few days longer. The maximum temperature during this period was 106.4° F. On the 33d day began a secondary fever which continued four days. The temperature was about 104 during this period. Calf ate but little during acute stage of the primary fever, was very sick, urine highly colored from urates; found no hæmoglobin in the urine. Fell off in flesh considerably, but ate well and improved in condition after acute stage of fever had passed. In fair condition when shipped. Jan. 9th, 3d day after arrival in Texas, temperature 103.2. Reported dead from snake bite May 28th; had carried ticks since February, without showing fever.

Bull No. 3. Weight when received 285 lbs.; gained in 60 days 25 lbs. Had fever on 9th day; continued 4 days, temperature ranging from 104 to 106° F. Secondary fever period arose on 34th day, continued 4 days 104 to 105.9° F. Fell off some in flesh, but ate well and recovered condition. Shipped Jan. 1 in fair condition. Jan. 9th, temperature 102° F. June 24th, temperature 102° F. carrying ticks. Aug. 14th, has carried ticks through spring and summer, and has shown no serious illness; in good health Oct. 1st.

Bull No. 2. Weight 300 lbs. when received; lost during experiment 10 lbs. Primary fever began on eighth day, continued 11 days, 104 to 105.7° F. Was free from fever about 13 days. Secondary period began on 33d day and continued a week, at 104 to 105.8° F.; was off feed at height of fever; got thin and suffered from cold, although well protected in a barn. Was in poor condition when shipped. Calf appears to be af-

fected with "Hoose"; had husky cough when brought to Missouri Experiment Station. Jan. 9th, temperature 104. June 24th, temperature 104; has some ticks. This bull died in the summer. From the description given the death was probably due to "Hoose," or lung worms.*

Bull No. 13. Weight 382 lbs. when inoculated; gained 18 lbs. Fever appeared on 9th day and continued 10 days, 103.9 to 108.4° F. A slight secondary fever 33d day, continued 4 days, 103 to 104° F. During height of fever was off feed and dull, head drooped. After fever had passed, ate well throughout the remainder of his stay. Was shipped in fair condition. Jan. 9th, third day after arrival in Texas, temperature 104. Jan. 11th, appeared well. Was found infested with ticks early in February, no fever. April 24th, no sickness since recovery from the shipping fever. June 24th, temperature 104. Has a few ticks, urine clear. July 22, doing well. Aug. 14th, doing well. Oct. 1st, in good health.

Bull No. 7. Weight when inoculated 390 lbs.; no gain. Fever on 8th day; continued 4 days, 104 to 105.8° F.; an occasional high temperature from 12th to 30th day. Secondary fever 29th to 35th day, 103.4 to 105.2° F. Did not thrive, fell off in flesh; somewhat thin when shipped. Temperature was not taken at Corpus Christi; and condition not mentioned. Became infested with ticks in February; no sickness apparent. April 24th, has done well. June 24th, temperature 102.4, and is extremely "ticky"; no depression apparent. Aug. 15th, in good health; Oct. 1st, doing well.

Bull No. 14. Weight when inoculated 390 lbs.; gained 10 lbs. Fever on 10th day, continued 6 days, 103.8 to 104.4. Slight recurrence on 25th to 27th days. Animal ate well and showed outwardly but little signs of fever. Shipped in fair condition. Jan. 9th, temperature on third day after unloading in Texas was normal, 102° F. Was infested with ticks in February, and has carried more or less through the summer. On June

* The above three calves had just been weaned before being sent to the Station and were not in proper condition for inoculation.

24th, very ticky but showed no signs of illness. Temperature 102.4. In May and June was put for a while with heifers. Aug. 15, in good health; Oct. 1, doing well.

Bull No. 17. Weight 410 lbs. when inoculated; gained 75 lbs. Fever on 8th day, continued 8 days, 104 to 105.5° F. On the 40th to 42d day temperature 104 to 104.7. Bull was off feed and dumpish during primary fever period. Made a good recovery and was shipped in excellent condition. The temperature was normal, 102.1, on the third day after reaching Texas. This animal carried ticks through the summer, but had no fever. June 24th, temperature 101.8; was carrying ticks. Was for a time with heifers in May and June. Aug. 15th, in good health. Reported well Oct. 1st.

Bull No. 12. Weight 412 lbs. when received; gained 18 lbs. Had not recovered from shipping fever when inoculated, temperature 104. Had a well marked primary reaction, maximum temperature of 107.4° F. on the 10th day, and fever ten days longer, ranging from 103 to 105° F. Secondary rise, 103.2 to 105.6 34th to 38th days. This bull was off feed occasionally, but ate well the greater part of the time. Was looking well when shipped. Temperature after reaching destination, 103. Has carried ticks since early in February. June 24th, was carrying ticks, temperature 101.4. Aug. 15th, was in good health. Did some service in May and June. Was reported Oct. 1st as looking well.

Bull No. 19. Weight 428 lbs. when received; gain 49 lbs. Fever on the 4th day. Continued about two weeks, 103.4 to 106° F. Slight secondary fever on 29th and 30th days, lost some weight during fever period, but regained flesh. Ate well most of the time; made good recovery and was shipped south in fair condition. Temperature normal, 102° F., on arrival in Texas. Ticks were found on him Feb. 10th. April 24th, no fever to date. June 24th, temperature 103, very ticky. Did some service in May and June. Aug. 15th, reported in good health. Oct. 1st, looking well.

Bull No. 15. Weight 455 lbs. when received; gained 20 lbs.

From 4th to 14th day, somewhat feverish (103.5 to 106.4° F., evening temperatures), but was not off feed. From 23d to 27th day, calf appeared dumpish, lay down considerably, ate some, but appetite not good. Morning temperatures 104.7 to 106.2; one evening temperature 106.5° F., on a cold stormy day, Dec. 3d. For twelve days succeeding this fever period, animal did well. A third period of fever began about the 39th day and continued eight days, 103.6 to 105° F. This calf had some fever when shipped. Jan. 9th, three days after arrival in Texas, temperature 102.6. Feb. 10th, had ticks. April 24th, no sickness to date. June 24th, temperature 103.7, very ticky. Aug. 15th, is in good health; was with cows and heifers in May and June. Oct. 1st, looking well.

Bull No. 26. Weight 480 lbs. when received; gained 20 lbs. Through the usual primary fever period the daily temperature was somewhat irregular, 103 to 104.5° F. Afternoon temperature on 10th day was 106.2. On the 19th day had a catarrhal discharge from nose. Was not off feed, and did not show outwardly any serious symptoms up to the 40th day, when he appeared dumpish. Had a regular fever period from 39th day to 43d. Temperature 103.8 to 106.8° F., the latter on the 42d day at 11 A. M. Except for a slight running at the nose was in good condition when shipped; was eating well. Temperature on arrival in Texas was about normal. Infested with ticks in February. April 24th, no sickness had yet appeared. June 24th, animal ticky, but appeared well. Aug. 15th, bull in good health, has done some service. Reported well Oct. 1st.

Bull No. 4. Weight 380 lbs. when inoculated; gained 45 lbs. Fever on 8th day continued 10 days, 103.4 to 105.8° F. Secondary fever began on 29th day and continued 8 days, 103.8 to 105.8° F. This bull ate well through the fever and except for some falling off in flesh following the fever period, no outward signs of the fever were noticeable. At time of shipment the animal was in fair condition. This bull was reinoculated by mistake on December 8th, the third day of the secondary fever period. Temperature on arrival in Texas, normal. Has

carried ticks during the summer. Reported in good health Aug. 15th and Oct. 1st.

Bull No. 21. Weight 415 lbs. when inoculated; gained 30 lbs. Fever on 4th day, continued 10 days; ranging from 103.6 to 104.4. Ate well and showed no marked outward signs of illness. Secondary rise on 33d day, and continued 5 days, 104 to 104.6° F. Shipped in good condition. This animal was reinoculated Dec. 8th with 2 cc. from a recovered native. Temperature on arrival in Texas 103.6, slight fever. Became infested with ticks in February. April 24th, reported in good health. June 24th, temperature 102.5, and carrying ticks. Aug. 15th, bull is still in good health; has done some service. Oct. 1st, reported well.

Bull No. 18. Weight 445 lbs. when received; gained 85 lbs. No distinct fever period occurred at the usual time following inoculation, only a few isolated high temperatures. On the 31st day and for a few days following the temperature was up to 104. The bull at this time was somewhat dumpish and off feed. The animal was reinoculated Dec. 8th at the beginning of this fever period, with 2.5 cc. from a recovered native. Was sent south in good condition. Had fever on arrival at Corpus Christi, Texas. Temperature Jan. 9th, 104.2. Was off a few days—probably a secondary reaction from the inoculation of Dec. 8th. Animal carried ticks through the summer. June 24th, temperature 103.4, bearing ticks. Was put with cows and heifers for a while in May and June. Was reported in good health Aug. 15th and Oct. 1st.

Tod's Bulls, Group II. Inoculated Nov. 15th, 1898, with 2.5 cc. defibrinated blood from Texan steer. They were shipped to Corpus Christi, Texas, Jan. 1, 1899, arrived at destination Jan 6.

Bull No. 8. Weight 370 lbs. when received; gained 10 lbs. Had fever during the 60 days at the Station. From 25th to 34th days a somewhat continuous fever, 104 to 105.6° F. Animal looked thin when shipped, although he had made a slight gain in weight. Temperature on arrival in Texas, 103. Car-

ried ticks through the summer; showed no serious illness, and Aug. 15th was in good health. Oct. 1st, reported well.

Bull No. 22. Weight 435 lbs. when received; gained 90 lbs. Had some fever when inoculated, probably from shipping. On 10th day was dull and off feed, afternoon temperature 106.3. From 30th to 33d days temperature 104 to 105° F., dumpish. The animal did well the greater part of the time, and was shipped in good condition. Jan. 9th, temperature, three days after arrival in Texas, 103° F. August 15th, in good health, has been well infested with ticks. Oct. 1st, looks well.

Bull No. 20. Weight when received 550 lbs.; gained 60 lbs. Scarcely any elevation of temperature until the 29th day after inoculation. From 29th to 37th days, 103.8 to 104.6° F. Was a little off, but did not refuse food. Did well and was shipped in good condition. Jan. 9th, temperature 103. Reported well April 24th, June 24th, and July 22d. Aug. 15th was still in good health. Has done service. Oct. 1st, reported in good health.

Bull No. 23. Weight 680 lbs.; gained 30 lbs. Fever on the 11th day, continued 8 days. Temperature ranging from 104 to 107.6° F. Animal was off feed, dumpish, laid down much of the time, and appeared to be extremely sensitive to cold. Had no secondary reaction. Made a good recovery, and was shipped in fair condition. Temperature Jan. 9th, 103.2. August 15, has carried ticks since early in February, and has shown no serious illness; has done some service. Was reported well Oct. 1st.

Bull No. 24. Weight 365 lbs.; gained 50 lbs. Had no distinct reaction at the primary fever period, but a few isolated high temperatures—105.6° F. on the 10th day, 103.8° F on the 12th day. On the 35th day and following, a more continuous fever occurred, the temperature ranging from 103.7 to 107.1° F. This bull was reinoculated with 2.5 cc. defibrinated blood from a recovered native on the 23d day after the first inoculation. Twelve days after this the fever period began. He made a good recovery and was shipped in good condition. Jan. 9th, temper-

ature 102.6. Was found to be infested with ticks in February. No illness resulted. Was in good health April 24th. June 24th, very ticky, temperature 103. No depression; in fair flesh. Aug. 15th and Oct. 1st, in good health.

Bull No. 16. Weight when inoculated 402 lbs.; gained 88 lbs. This bull was inoculated twice, but during the entire 60 days that he remained at the Station only a few high temperatures were observed—on the 8th day 103.8; 17th day, 103.9; 21st afternoon, 106; 34th day, 103.9; 40th day, 103.6° F. No continuous fever period occurred. This bull ate well and kept in excellent condition. Had some fever on arrival in Texas, 104° F., Jan. 9th. A delayed reaction may have occurred. This animal became very ticky and on June 24th had some fever, 104° F., but outwardly showed no marked signs of illness, and no depression. Aug. 15th, no illness. Was with cows and heifers a part of May and June. Oct. 1st, was in good health.

Bull No. 10. Weight 480 lbs.; gained 105 lbs. Showed but little rise of temperature from the first inoculation. Was reinoculated twenty-three days later (Dec. 8th) with 2½ cc. blood from a native made immune by artificial tick-infestation. A marked fever period followed this second inoculation, beginning on the fifth day and continuing six days or longer. This fever period corresponds in time to the secondary reaction of the usual type, and it is possible that this may be a delayed response to the first inoculation. Jan. 9th, temperature 101.1; Feb. 10th, had ticks. April 24th, no illness to date. June 24th, July 22d and Aug. 15th, in good health. Has done some service. Oct. 1st, was looking well.

Bull No. 28. Weight when received 498 lbs.; gained 47 lbs. Had an occasional high temperature following the first inoculation, but no sustained fever period. A well marked fever period followed the second inoculation, averaging 104.2 for nine days. In good condition when shipped. Jan. 9th, temperature 102.6° F. Reported in good health Feb. 10th, though carrying ticks. Also reported in good health April 24th, June 24th, July 22d and Aug. 15th, and Oct. 1st.

Has borne ticks. Has done service with cows and heifers.

Bull No. 25. Weight 507 lbs. when received; gained 38 lbs. No fever period occurred at the usual time following the first inoculation, but 11 days after the second inoculation the temperature rose to 105 and continued at about this point for five days. Jan. 9th, temperature 102° F. Aug. 15th, has carried ticks through the summer, and has shown no illness. Has done some service. Oct. 1st, was reported doing well.

Bull No. 5. Weight when received 600 lbs.; gained 80 lbs. Temperature normal for 27 days following first inoculation, except on 12th day, 104.8° F. Reinoculated on the 23d day; five days later a well marked fever period began and continued five days. Temperature 104 to 106.5° F. Was somewhat dumpish, but continued to eat; was shipped in good condition. Jan. 9th, temperature 102.2. June 24th, 102.2. Aug. 15th, is in good health after carrying fever ticks through the summer. He has done some service. Reported in good health Oct. 1st.

Group III. Inoculated Nov. 29th, 1898, 1 cc.; and Dec. 8th, 1898, 2 cc. Shipped to Corpus Christi, Texas, Jan. 1, 1899. Arrived at destination Jan. 6.

Bull No. 58. Weight when received 505 lbs.; gained 135 lbs. Had shown scarcely any signs of reaction up to the time of shipment, only two high temperatures, 104° F. on the 11th day after the second inoculation, and 103.8° F. on the 17th day. This animal was never off feed. Jan. 9th, temperature 103.6° F., a slight elevation. A secondary reaction of mild type may have occurred at about this time. Jan. 20th, arrived at ranch 25 miles from railroad. Feb. 10th, bearing ticks. April 24th, no sickness observed to date. June 24th, animal well and bearing ticks. Aug. 15th, is now in good health; has done some service. Oct. 1st, looking well.

Bull No. 11. Weight when received 620 lbs.; gained 110 lbs. Fever arose on the 6th day after first inoculation, and continued for five days, varying from 104.2 to 106.3° F. During fever period was off feed, dumpish, back arched. Made a good recovery and was shipped in excellent condition. Jan. 9th,

temperature 103.1° F. Became infested with ticks in February. April 24th, no sickness to date. June 24th, is carrying ticks, appears well. Aug. 15th, in good health; has done service. Oct. 1st, reported well.

Bull No. 29. Weight 715 lbs. when inoculated; gained 30 lbs. No fever period had occurred up to the date of shipment, and only one high temperature, 104.1° F., on the 21st day after the first inoculation. This animal had some fever after arrival in Texas, 104.6 on Jan. 9th. This fever occurred at about the time for a secondary reaction following the inoculation on Dec. 8th, but possibly may have been simply shipping fever; did not thrive well for some time. Arrived at ranch safely. Feb. 10th, found ticks. May 13th, turned with cows; found sick June 7th, twenty-five days later; temperature 104° F. Was taken away from cows and kept quiet for a couple of weeks and was then turned out to service again, and has been well since. Reported well Aug. 15th and Oct. 1st.

(*To be continued.*)

DOG DISTEMPER.

By Coleman Nockolds, M.D., V.S., Grand Rapids, Mich.

Synonyms.—Dog plague; canine disease; bench show disease; typhus fever of the dog.

Definition.—An infectious disease of the dog, characterized clinically by catarrh of the respiratory and digestive tracts, together with profound muscular and nervous prostration.

This disease occurs often as an epizoötic, especially during dog shows. There is no country nor climate in which the dog is exempt from distemper.

Although the dog is the animal most frequently attacked, other animals, as the cat, fox, coyote, monkey, hyena, lion, tiger, prairie dog, and others, are sometimes the victims of distemper.

Etiology.—Amongst predisposing causes, cold, young age,

weakly constitution, inbreeding, washing, debilitating diseases, parasites, shipping, œstrum, surgical operations, ovarectomy, emasculation, docking tails, trimming ears, hæmorrhage, wounds accidental or otherwise; in fact, any condition that tends to lower the vitality, or expose the animal to sudden changes of temperature, would act as a predisposing factor. The exciting cause is undoubtedly a micro-organism, but the specific agent has not been determined.

Distemper is one of the most common diseases of the dog; it is most common during the spring and fall, but occurs at any period of the year. The germ gains entrance to the system through the medium of the air. No doubt the micro-organism is almost universally distributed, but requires some extraordinary atmospheric condition to render it so virulent as to attack all subjects. Under ordinary atmospheric conditions, it seems content to attack only those dogs that are predisposed, and occurs as a sporadic or occasional trouble, being in existence among dogs at all times of the year; but it is only under special conditions that it breaks out in the epidemic form. At the same time it is always communicable from one dog to another by contagion, or it may be transferred by fomites.

Manner of Invasion.—Not determined positively, though probably by inspired air through the respiratory apparatus, also very likely through the alimentary canal, and in rare cases the conjunctiva. Dogs, cats and other animals are liable to contract this disease at all ages, and under any conditions, but predisposition renders them more susceptible. It must be remembered that even the healthiest are not exempt.

Immunity.—One attack renders the animal immune as a rule, but it can be contracted more than once. An attack always confers immunity for a certain period at least.

Period of Incubation.—Rarely exceeds three days, but varies according to the condition in which the exposed dog is in, to a more or less extent. During the period intervening between the time of exposure, and the actual onset of the attack, the dog is often depressed and shivers. The temperature may be

elevated slightly, especially if the animal is weakly, or of a nervous temperament. Myalgic pains, prostration and partial or complete anorexia are amongst the signs observed during the period of invasion.

General Symptoms.—The true onset of distemper usually is ushered in by a severe rigor, with a rapid rise of temperature which may be at its height in twenty-four hours, 106° F., sometimes reaching as high as 110° F.; again the disease may start with slight shiverings, followed by a gradual rise of temperature, and occasionally the fever is intermittent. Vomiting is of frequent occurrence during the first stages. Often complete anorexia exists, or the appetite may be capricious. Pulse is either small, feeble and irregular, or rarely unusually slow, due to cardiac debility. The heart beats tumultuous and irregular, or weakened. A slight discharge from the nose and eyes is present in the majority of cases; this soon becomes excessive, of a muco-purulent nature, drying on the edges of the eyelids, causing them to adhere. The nose may be hot or cold; it is dry. Pain is present, causing the animal to groan. The head is hot and aches. Constipation or diarrhœa are present, and usually a slight husky cough exists. The bronchial tubes are affected. A well marked rash located on the inner side of the thighs makes its appearance in the majority of cases. As the disease advances these symptoms become aggravated, emaciation occurs, the coat looks dull, and there is present the characteristic odor of distemper. Often grave complications present themselves.

Distemper takes various clinical types:

(*a*) Respiratory.—This is the most common type. There is present various well marked catarrhal troubles. The conjunctiva is red, dry and swollen at first, but later excessive lachrymation; finally, a discharge of a muco-purulent character, part of which dries on the margin of the lids, causing them to adhere; photophobia exists. The animal sneezes constantly and there is a cough present, these conditions occurring as a result of a dry laryngo-tracheal mucous membrane, which causes

an irritation. Soon a discharge from the nose and mouth takes place; this later may be ropy or frothy. Bronchitis exists, which is detected upon ausculation by the presence of ronchi, at first sonorous, later mucous. Often this form of distemper runs into broncho-pneumonia, which must be regarded as a complication. Laryngitis and pharyngitis are invariably present, and as the disease progresses opacity of the cornea, leucoma or even keratitis may occur.

(*b*) Gastro-intestinal.—Most often the first manifestation that presents itself is persistent vomiting; especially does this occur when the animal takes food. The buccal membrane is hot and dry, tongue furred, either white or brown, offensive breath; dyspepsia, accompanied by a diarrhœa, which is fœtid and frothy or mixed with blood and mucus. Occasionally constipation exists, but it is invariably followed by diarrhœa; abdomen is tucked up and colicky or constant pains occur. It is in this type of distemper that the temperature rises gradually; tympanitis exists; visible mucous membranes are pale or dirty. Excessive prostration and rapid emaciation are well marked in the gastro-intestinal type of distemper.

(*c*) Nervous.—This type may be divided into three forms. 1. Hydrophobic, characterized by the fiery eye, hot cranium, excitement, restlessness. Dog runs about, falling over objects or runs into the wall; acts just as if there was loss of vision; salivation occurs, often delirious, as is shown by the meaningless bark. This soon gives place to prostration, stupefaction, or even coma.

2. Chorea. Twitching of muscles in various parts of the body, especially the muscles of the jaw, head, limbs or thorax.

3. Paralytic. Often the hind limbs are the first affected by paralysis; may extend all over the body.

(*d*) Rheumatoid.—Is shown by violent pains or tenderness in any or every part of the muscular apparatus. If affected parts are touched, animal cries out. Pains are often more pronounced in the lumbar region, the shoulder or haunch. There

is no change in the joints, but a regular muscular rheumatism accompanied by general signs of distemper.

(*e*) Integumentary.—The appearance of a rash upon the skin, especially on the inner sides of the thighs. At first it resembles a slight erythema, but soon vesicles form, which go through the regular stage to pustules, which burst and discharge, leaving little patches of ulceration, which finally heal by cicatrix. These pustules may coalesce, forming large ulcerating patches. This rash is quite characteristic of dog distemper, and in a slight degree it is present in the majority of cases. Sometimes a general exfoliative dermatitis occurs. Diagnosis is often difficult, especially in the earlier stages. The history of the case, catarrhal symptoms, excessive prostration, rise of temperature, are the chief symptoms upon which to base the diagnosis. If the rash accompanies these the case is invariably distemper.

Complications.—Most frequent is broncho-pneumonia, which condition appears as an extension of the bronchitis present. In fact it is difficult to determine the exact time at which the broncho-pneumonia starts. Lobar-pneumonia is another complication which occurs. It generally comes on quite suddenly at about the time that convalesence begins; it is rare that it occurs at the beginning of an attack of distemper. It frequently causes the death of the patient, coming on as it does when the vitality is so lowered that there is not strength enough left to combat any disease. In either of these conditions it will be noticed that the respirations are out of all proportion to the amount of lung tissue involved, uo doubt due to the extreme weakness of the animal. In the lobar form of pneumonia the temperature goes up suddenly, whilst in the lobular form the temperature rises gradually and often in a very irregular manner. The physical signs are, in the lobular no change upon percussion except several inflammatory centres have united over a considerable portion of the lung substance, in which case of course certain dull centres may here and there appear; upon auscultation the signs of bronchitis are present with mucus or sub-crepitant

râles. Generally both lungs are affected and the temperature is high and irregular. In lobar pneumonia the characteristic stages of engorgement, red and grey hepatization, appear. This complication occurs as a rule during the early convalescent period, and is ushered in with a well marked chill, followed by general fever, pain in side, furred tongue, scanty urine, which if examined for chlorides it will be found that they are decreased in quantity; cough, thick glary discharge from nose and mouth; discharge from nose may be tinged with blood, pulse full and quick, respiration hurried, and high regular temperature, averaging 105 degrees.

In first stage no particular change on percussion, but upon auscultation fine crepitation, which is probably due to the bubbling of air through the fluid with which the vesicles are filled. During the second stage or that of red hepatization, there is dullness over the solidified portion upon percussion, and upon auscultation bronchial breathing, absence of respiratory murmurs and of crepitation, whilst percussion in the third stage gives dullness over the solidified portion and ausculation shows the same condition as in the second stage, with the addition of mucus gurgling. These signs vary, as often all three stages of pneumonia may be in existence at the same time. Usually only one lung is affected, most often the right, but both may be involved.

Sometimes congestion and again œdema of the lungs occur as complications; they are often associated with pneumonia. Pleuritis is manifested by the pain, fixed thorax, cough, the friction sound synchronous with the breathing due to the grating of the dry pleural surfaces open each other. Fever, small, hard, rapid, "wiry" pulse—this often ends in hydrothorax. Of course, as a result of pneumonia, gangrene or abscess of the lungs may occur, which would terminate the life of the dog.

Cardiac Complications: Heart failure often manifests itself, but is rarely fatal except the pericardium is involved. As gastro-intestinal complications, I may mention pernicious vomiting, gastro-enteritis, intense abdominal pains, tympanites, hæm-

orrhage from stomach or bowels, perforation of intestines, jaundice due to duodenal catarrh.

The nervous symptoms that we must look upon with alarm are delirium, shown by the glassy eyes, meaningless bark, frightened or savage look, animal trying to hide or running about, stumbling over objects. This is often the result of a general inflammation of the coverings of the nerves and cord. Coma, due to the cerebro-spinal membranes becoming involved or even cerebral abscesses.

Nephritis, cystitis, hæmaturia are the common complications which occur in the urino-genital system. These are diagnosticated by finding pus, albumen, casts or blood in the urine. No doubt the animal is rendered more liable to complications during an attack of distemper because of the profound prostration doing away with the phagocytic action of the leucocytes, thus giving disease factors more chance to prey upon the tissues; at the same time 96 per cent. of the complications occurring, especially those of the respiratory tract, can be traced to undue exposure during the course of the disease or convalescence.

Differential Diagnosis. — Distemper and its complications must be distinguished from pneumonia, occurring as a primary disease. Coryza, bronchitis, simple diarrhœa, dysentery, dyspepsia, internal parasites, hydrophobia, excitement, chorea, paralysis. Sometimes, especially in young animals, distemper is ushered in by convulsions, which must not be mistaken for epilepsy or strychnia poisoning. Most eye troubles in the dog must be looked upon with suspicion unless they can be traced to a direct traumatism. Eczema or mange is liable to be mistaken, but we must examine the animal, and in the majority of cases there will be other lesions of distemper present.

Sequelæ.—Bronchiole, otitis, amaurosis, cataract, paralysis, chorea, chronic nephritis, chronic dyspepsia, loss of special senses (as hearing, smelling, seeing), keratitis, iritis, glaucoma corneal ulcers, staphyloma, deformities.

Duration and Prognosis.—In mild cases, from 8 to 10 days.

Severe cases three months. Average duration, 3 to 4 weeks. Prognosis depends upon the case, but if carefully treated and above all good hygienic surrroundings and nursing, it is good, but should always be guarded. In young and anæmic animals if the disease is generalized, especially when complications are present, the prognosis is grave. Strong, well-nourished dogs, and the disease localized, prognosis good. Death is due either to cerebral paralysis, pulmonary œdema, septicæmia or exhaustion. (*To be continued.*)

STATE WORK WITH INFECTIOUS DISEASES OF ANIMALS.

By M. H. Reynolds, M. D., V. M., St. Anthony Park, Minn.

Presented at the annual meeting of the State Agricultural Society, at St. Paul, Jan. 10–11, 1900.

There are certain things which I wish to accomplish in the presentation of this paper. I wish to interest all members of the State Agricultural Society and the Minnesota Stock Breeders' Association in the work of the State Board of Health, and particularly in the work of the Veterinary Department. It is your work and done mainly for your business interests. Mistakes in this work may cost your interests hundreds of thousands of dollars. Good work may save as much. The success of veterinary sanitation depends on the support of stockmen and veterinarians. It is important that those most interested should be informed concerning the work to be done and methods of accomplishing it.

The Minnesota State Board of Health consists of nine members. The work has been divided into three departments: Secretary and general executive officer, bacteriological laboratory, and veterinary department.

Minnesota is credited with having one of the best if not the best state law relating to infectious diseases of domestic animals. There are certain points in this law which I wish to present in order that our work may be well understood.

Section 1, Chapter 233, gives authority to the state and various local boards to take such steps as they may deem necessary to control infectious diseases among domestic animals. These boards are given authority to regulate or prohibit the arrival in or departure from this state, and the towns, villages and cities thereof, of exposed or infected animals.

Section 2 reads as follows:

"Any person that knows of, or has reason to suspect, the existence of any contagious or infectious disease in any domestic animal, shall forthwith give notice thereof to the local board of health of the town, village or city, where such animal is kept. Within twenty-four (24) hours after any local board of health shall receive notice that any domestic animal is infected with any such disease, or has been exposed thereto, it shall give notice thereof in writing to the state board of health."

Section 4 provides that no animals shall be killed by any of these boards until it has been adjudged to be affected with a contagious or infectious disease, either by a physician or veterinary surgeon properly selected and employed. The State Board is given authority to kill any animal which has been exposed, although not at that time affected with the disease, if in the judgment of this board it is necessary to do so.

Section 5 provides for the owner's protection, giving him authority under certain conditions to protest, demand post-mortem by three experts, and the privilege of appraisal if the animal is found to be free from infectious diseases.

Section 7 provides that local boards must carry out and enforce orders and regulations of the State Board. It also gives the State Board authority to require two or more boards to act together when desirable.

Section 9 provides penalties. Suit may be brought in justice court. Fine may not be less than $25 nor more than $100, or imprisonment not less than 30 nor more than 90 days. This section also provides that any member of the local board of health neglecting or refusing to carry into effect the provisions of this law or the rules or regulations made by the State Board of Health shall be guilty of a misdemeanor punishable by a fine of not less than $25 nor more than $100, and each day's neglect

or refusal constitutes a separate or independent misdemeanor.

Section 11 authorizes private owners whose stock are not affected to establish private quarantine in self-defense during the prevalence of an infectious disease among domestic animals, and makes such private quarantine legal. Permit me to explain at this point, as illustrating my thought, that members of this and similar associations should be personally interested and informed concerning this work. Section 11 was suggested by the Secretary of the Stock Breeders' Association, and I consider this one of the best points in the new law.

Section 1, Chapter 47, reads as follows:

"It shall be the duty of the owner, or of any other person having in charge any swine that have died of any disease, immediately upon the fact of such death by disease coming to his knowledge, to bury the same at least three (3) feet below the surface of the ground, or burn the same so that the carcass is consumed. No person shall sell, give away or offer for sale any swine that have died of any disease, or have been killed on account of any disease. No person shall convey upon or along any public highway, or other public ground, or any private land, except his own, any diseased swine, or swine that have died of or have been slaughtered on account of any disease. It shall be unlawful for any person negligently or wilfully to allow his hogs or those under his control afflicted with any disease to escape his control or run at large."

Then follows a definition of penalties.

Glanders discussion omitted because already covered in the paper on "State Control of Glanders," by the same author, and recently published in this magazine.

Hog Cholera.—I have been somewhat disappointed with the progress we have made in the hog cholera work during 1899, and I feel that we are at a critical point in this work. Very satisfactory progress was made in 1897 and 1898, as I will soon show in a brief table. The difficulty this year has been to secure prompt reports of outbreaks, and this difficulty is due to an outcropping of natural human selfishness. Unless the State Board can secure prompt reports, the work of further reducing the infected area and financial losses will be greatly hindered. During the past quarter 39 townships in 19 counties have been reported as infected with hog cholera.

The following table gives a reasonably accurate survey of the

situation during 1897, 1898 and 1899. The number of townships and financial losses for 1898 and 1899 should probably be somewhat larger. Please bear in mind that this work did not begin until 1897 and that 43 counties were then infected. It is not difficult to check a small outbreak of hog cholera and completely cradicate the disease, but 43 infected counties to deal with in a state as large as Minnesota is a very different proposition.

Year.	Counties infected.	Townships infected.	Loss.
1896	43	—	$1,000,000
1897	41	254	487,500
1898	32	93	325,000
1899	32	75	252,000

I wish to explain again that this table is not presented as being absolutely accurate, but it is as accurate as existing information allows. The relative proportion of losses and townships infected is probably very nearly correct. Other natural conditions have had something to do with this decrease in the infected area and financial losses. It is difficult to estimate just what proportion should be credited to the work of the State Board and what to natural conditions, but it is evident that these natural conditions do not alone account for the improved situation. The following is submitted as showing the needs of general information concerning hog cholera, and the necessity of vigorous work. Hog cholera appeared in a certain township of Stearns county during the early summer. The township chairman called on the owner soon afterwards and quarantined the hogs and pens, giving instructions as to what should be done. The chairman considered this owner a good citizen and did not watch things as closely as he would otherwise have done. We have since learned that this farmer lost quite a lot of hogs. They were left unburied, although the law expressly orders to the contrary. The outbreak in this township has since been around this man's farm in all directions, and has apparently been spread largely by dogs.

There are two adjoining townships in one of our most southern counties where hog cholera appeared last June. The chair-

man did nothing to check its spread and the outbreak became very general. They did not even obey the most explicit directions of the law. Three adjoining townships received infections from these two, but infected places were quarantined and in no case did the disease spread beyond the first quarantine. The two generally infected townships reaped a disastrous harvest. This would not be so bad if they had not been a constant source of danger for adjoining townships where the chairman and farmers were law abiding.

An interesting situation developed in connection with an outbreak in Polk and Red Lake counties. During the course of our work last season we learned that hogs had died on a certain farm during the previous fall. Dead hogs were thrown into Red Lake River in the northern part of Gentilly township. Red Lake River is reported as having a very sluggish stream, and in the early spring outbreaks appeared on a series of farms along this river, down stream. The disease was then carried from these farms to the surrounding country and a very serious outbreak of hog cholera was the result, and yet intelligent people say that hog cholera spreads in the air and in a great variety of mysterious ways, and hog cholera is just hog cholera and there is no use in attempting to do anything with it. The outbreak just referred to had its plain origin when the careless farmer threw dead hogs into the sluggish stream.

It is very probable that there have been few outbreaks of hog cholera in Minnesota where the method of spread was not simple and easily understood if we could only get the facts.

Mr. ————, of Greenville township, Dakota county, assisted a friend to load a car of hogs, and during this work he was in the stock car. After finishing the work he went home and took care of his own hogs. In about two weeks cholera broke out in his herd with no other cases in the vicinity, and yet he only walked around in the stock car and some railroad shipping pens.

Mr. G. went to Shakopee and attended a street fair. Bought seven young pigs. Took them home. In a few days

these pigs were sick, some of them dying. In about two weeks the rest of his hogs were taken sick, and they all died. A neighbor helped Mr. G. move the pigs from the wagon in which they were brought to the sale over into Mr. G.'s wagon. He then went home and in about two weeks his hogs were dying with cholera.

Not very long ago a farmer living near Morgan, Redwood Co., shipped in some hogs from Olmsted Co., and, by the way, contrary to the regulations of the State Board of Health. These imported hogs infected those previously on the place and resulted in an oubreak of cholera.

A farmer living near Sleepy Eye sold some hogs to a buyer at that place. The hogs were placed in the shipping pens, and, contrary to the regulations of the State Board of Health, sold to another farmer, who took them back to the country. These hogs were free from the disease when the first sale was made. No cholera had existed in the neighborhood from which they came. After the usual period of about two weeks they became sick and were dying with cholera. Result, another outbreak of cholera. It is very evident that these hogs were infected in the railroad shipping pens.

Suppose a case: Hog cholera appears in a previously uninfected district. The outbreak is confined to two or three farms. In a reasonably intelligent and law-abiding neighborhood this outbreak can be quarantined with reasonable certainty of complete success, providing the chairman posts quarantine placards, visits the neighbors, gives all the information at hand concerning the nature of the disease, how it spreads, etc., urges owners whose hogs are not infected to post quarantine cards, etc.

But suppose the chairman takes no interest; suppose the owner leaves carcasses of hogs unburied after a representative of the State Board of Health has left. Dogs are numerous. Neighbors refuse to accept suggestions concerning dogs and other sources of spread; visitors pay no attention to the notice cards—quarantine is a failure. The disease spreads rapidly, not necessarily because the theory of quarantine is wrong, but merely be-

cause of the listlessness and general uselessness of the chairman and the stubbornness and selfishness of the owner and the indifference of the neighbors. "Render to Cæsar the things that are Cæsar's."

That it is possible to maintain successful farm quarantine for hog cholera has been demonstrated over and over again during the past three years. Whether individual farm quarantine is successful or not depends largely upon the township supervisors and the individual farmers. The mere fact that individual farm quarantine has not been entirely successful in many townships does not contradict this statement. The thing for the farmers of Minnesota to do is to let go of this idea of finding a medical cure for hog cholera and undertake an intelligent prevention. It is probable that a satisfactory serum for vaccination will be developed in the near future, but that alone will not solve the problem by any means or do away with the necessity of sanitary measures.

The following extracts from the "Circular of Information for Local Health Officers," together with the "Hog Cholera" quarantine and the owners' "Notice" cards, will give some information concerning the present methods of dealing with this disease.

When hogs begin to sicken and die during the prevalence of hog cholera the disease should be reported to the local health officer or chairman of the town board, and quarantine should be established at once. It is a simple matter to release quarantine, and should it be proven that the disease is not hog cholera, no harm has been done by such quarantine.

All health officers and acting health officers are therefore instructed to see that suspicious outbreaks of disease among hogs are properly quarantined.

The health officer should explain to the owner or keeper the nature and conditions of quarantine, and see that the conditions are rigidly enforced until quarantine is released.

Hog cholera is often spread by water in small streams and lakes, and for this reason hogs must not be buried near any such lake or water course.

Dogs and poultry should not be allowed access to yards or pens where hogs are confined during the hog cholera season, and pigeons and crows should be shot or otherwise frightened away because of danger that they may spread the disease.

The health officer or inspector should always wear overalls and over-

shoes or rubbers when going among diseased hogs. These overalls and overshoes or rubbers should always be kept a safe distance from healthy hogs and from other agents which might convey the disease.

Quarantine cards must not be removed until six months after the last hog has died or recovered, and the premises disinfected in a way satisfactory to the local board of health.

Farmers should be urged to dispose of marketable hogs for slaughter as soon as suspected hog cholera appears in a neighborhood.

Neighbors, on whose farms the disease has not yet appeared, shonld never be allowed to help haul the hogs from infected farms, as there is great danger that the disease will be spread from farm to farm by such action.

Tuberculosis:—I wish to make a special effort at this meeting to interest members of these associations in the subject of "Bovine Tuberculosis," particularly as affecting the cattle breeding interests. The problem is a very large one and extremely difficult. There is no possibility of question but that tuberculosis prevails among pure bred cattle. This needs no further demonstration, neither is there any question as to the reliability of tuberculin as a means of diagnosis. This has also been demonstrated beyond possibility of reasonable question. It is practically settled that the germ causing bovine tuberculosis and the germ causing human tuberculosis are identical as to species and differ only as modified by slightly different environments in different animal bodies. These and a host of other questions need not trouble us. The difficult question is, what to do about it? What steps to take and how to take them in order that the spread of tuberculosis among pure bred cattle can be lessened or controlled, without at the same time causing the breeder great financial losses and endangering the cattle breeding interests of the State, which it is our business to foster rather than injure. I will have some suggestions to make later concerning this problem.

WHAT OTHER PUBLIC AUTHORITIES ARE DOING.

Pennsylvania tests cattle at the expense of the State, furnishing veterinarian and tuberculin. State pays partial valuation for condemned cattle. State veterinarian reports that when this work was commenced three years ago the task seemed almost hopeless. Statistics show constant diminution of react-

ing cattle and the inference seems reasonable that tuberculosis is less prevalent in that State than when the work began. Up to June 1, 1897, the average percentage had been 20.4. From this time until January, 1898, 13.73 per cent. During 1898, 14,437 cattle were tested in this way, 1348 reacted—12.9 per cent.

Pennsylvania tests only upon application, and not only that but application must show reasonable evidence that tuberculosis exists in the herd. Their annual report indicates that applications are much more numerous than can be granted. The owner is required to submit reasons for making the examination. He must make application for test and agree to do all in his power to keep the herd free from tuberculosis in the future. Quite a different situation from what we have here in the West

Pennsylvania prohibits the importation of dairy or breeding cattle, except upon tuberculin test. No compensation allowed for cattle imported contrary to law.

Massachusetts is now appropriating about $75,000 annually for the work with infectious diseases, a very large proportion of which is used in the work with bovine tuberculosis. Pennsylvania has an annual appropriation of about $40,000 for dealing with infectious diseases of domestic animals. Of this appropriation a very large portion, about $28,000, is used for dealing with bovine tuberculosis.

Illinois has recently put into effect an order prohibiting the importation of untested cattle for breeding or dairy purposes. Iowa is making quite an active stir concerning this problem, although she may not take any radical step at this time. Yesterday a tuberculosis convention was called to order in Des Moines for the express purpose of discussing the problems connected with bovine tuberculosis and to recommend such measures as seem wise. Prominent speakers from various parts of the United States were on the programme. The State Veterinary Association of Iowa is in session to-day and to-morrow, and it is the expressed purpose of this association to bring in-

fluence to bear upon the legislature looking toward legislation similar to that in effect in other States.*

In view of recent developments in certain of the Eastern States and among our neighboring States here in the West it may possibly become necessary for Minnesota to take some radical action concerning the importation of dairy and breeding cattle. I have hitherto taken the position, so far as Minnesota is concerned, that so long as cattle in neighboring States were probably no worse affected with tuberculosis than our own, we were not justified in prohibiting the importation of untested cattle. This proposition came up in Wisconsin something like a year ago, and I made a similar proposition to the Wisconsin representatives, that so long as Wisconsin was no better in this respect than her neighboring States, there would be nothing gained by such a measure. But the problem has assumed a different phase. When our neighboring States adopt measures similar to those now in force in Illinois, Minnesota will be compelled to do likewise or become a dumping ground for tuberculous cattle. A considerable number of cattle, largely dairy cows, are shipped each year from this State to Illinois. Nearly all of these cattle are tested before shipment. The healthy cattle are shipped into Illinois; the tuberculous cattle are left on our hands. If dairy or breeding cattle are tested in Iowa with a view to shipping into Illinois, the same thing occurs; the healthy cattle are shipped into Illinois, the diseased cattle may be moved over the line into Minnesota.

During the past three months there have been tested in this state 2768 cattle of all kinds, of which 135 reacted and 25 were killed; an average of 5.1 reactions. But the majority of these were not breeding herds. All of the dairy and breeding herds belonging to state institutions in Minnesota are now being tested regularly, and the officers of these various institutions are now in sympathy with this movement, although it was rather difficult to get the work started.

* Since this paper was written Missouri has issued a proclamation similar to that now in force in Illinois.

The following table is taken from our Experiment Station Bulletin, No. 51, and is quite suggestive as to the influence concerning the prevalence of this disease among natives, high grades, pure breds, city dairies, and in the various conditions of stables:

TABLE XLVIII.—PREVALENCE ACCORDING TO CLASS AND CONDITION.

TABLE SUMMARY:—GREATEST PREVALENCE AMONG "PURE BREDS," "CITY DAIRIES," "POOR CONDITION OF STABLE" AND "POOR VENTILATION." FARM CONDITIONS, GOOD STABLES AND VENTILATION DO NOT PREVENT INFECTION, HOWEVER.

	CLASS.	Number of herds tested.	Number animals tested.	Number reactions.	Per cent. tuberculous.
1	Natives	137	2839	223	7.8
2	High Grades	5	157	17	10.8
3	Pure breds	6	258	43	16.6
4	Farm herds	38	694	99	*14.2 (7.8)
5	City dairy herds	108	2736	284	10.4
6	In "good" general condition of stable	57	1370	139	*10.1 (6.8)
7	In "fair" condition of stables	59	1140	83	7.28
8	In "poor" condition of stables	32	864	165	19.1
9	With "good" ventilation	45	1011	99	*9.8 (5)
10	With "fair" ventilation	45	1087	67	6.16
11	With "poor" ventilation	48	1210	201	16.6

NOTE.—Fifty-five of these tuberculous animals in each case—(groups 4, 6 and *9) were from the same two herds. Eliminating these two herds from groups 4, 6 and 9 the percentages are reduced respectively to 7.8, 6.8 and 5.

This data was collected in the most impartial way that could be devised and with the sole view of investigation. This showing is what any student of sanitary matters should expect. The mere fact that the percentage of tuberculosis is highest in pure bred herds should not suggest that men should not breed pure bred cattle. It only suggests that men should not establish herds upon tuberculous foundations. They should breed healthy pure bred cattle, not tuberculous pure bred cattle. The figures here given should be taken as percentages for certain classes, and not as representing the entire cattle stock of Minnesota.

A careful experiment, which was conducted on a rather large scale by the Experiment Station several years ago, demonstrated quite fully that the tuberculin test was practically without effect upon dairy cows in full flow of milk, or upon fattening steers; and the effect upon tuberculous cattle was favorable rather than otherwise.

I wish to suggest a conference committee, consisting of five representative breeders of the State Agricultural Society and Stock Breeders' Association, to confer with representatives of the State Board of Health and Experiment Station. Let representatives of these two societies be experienced breeders, men who are personally and financially interested in a proper and safe solution of the problem.

What will Minnesota do? What is the wish of the stockmen of Minnesota concerning this great problem? Is it worth our serious consideration? What will we do about it?

CHROMIC ACID.

By W. C. Hanawalt, V. S.

Read before Illinois State Veterina y Medical Association, February 21, 1900.

Mr. President and Brother Doctors: Believing that chromic acid is a more important drug than most people deem it to be, and also believing that our materia medica does not give the remedy the amount of attention it deserves, is my excuse for writing this article.

Finlay Dun gave it about one and one-half inches of space, which would lead one to suppose its importance about the same.

The sixteenth edition of the U. S. P. gives the best therapy of the agent that I have seen in print and to it I would respectfully refer you as to its medicinal uses. The uses to which I shall call your attention are those to which I myself have used it successfully in practice.

During the summer of 1890 I was called to treat a four-year-old gray filly for fistula. The animal was very weak and

greatly emaciated and had the largest fistulous tumefaction I ever saw. In fact, this tumefaction was so large I would fear the loss of your respect for my truthfulness should I give its dimensions. I recommended six weeks' rest with good care and feed and 30 grains of sulphate quin. with tr. fe. chlor. three times a day; as I told the owner, "to get something to work on besides the fistula."

This beast had been treated (?) one year by a "Thistlo" horse doctor and pronounced incurable previous to my services. After the horse had recuperated sufficiently I began the treatment as follows: With a silver director I probed the sinuses, laid them open with the bistoury, made a swab by wrapping white muslin projecting over the end of a stick, dipped it in the solution of chromic acid, 1 part and aqua 500 parts, and with this entered the fissures and sinuses, applying freely the diluted acid to the diseased parts.

After a few days the tissues parted, the diseased from the healthy part, leaving a clean, granulating surface, which, with the aid of the "white lotion," soon healed without a scar or blemish. That I may not be misunderstood I will say that it took about eight weeks to effect this cure, and some new sinuses were treated in the aforesaid manner as they made their appearance from time to time.

Case II. A bay gelding, eight years old, used as a dray horse, acquired a sore on his back from the backband of the harness chafing it.

This sore refused to heal for the remedies generally used for such abrasions; then my attention was called to it and I found a red, spongy, warty, quick-growing tumor which I could not give any special classification at the time, and even now would hardly dare to try to classify it.

To this tumor, after breaking all the tender substance down with my thumb nail, I applied freely the chromic acid solution as given above and the result was a speedy, permanent cure without any further treatment whatever.

I might mention numbers of these trivial cases, but

this, I believe, is sufficient for these minor occasions.

Case III was another patient treated by one of those "Thistlo" doctors for one year without success. This was a bay filly, 3 years old, with a very simple looking fistula with a sinus running down along the anterior border of the spinous process of the second dorsal vertebræ, and involving the branch of the ligamentum unchea.

It discharged a granular, whitish, fœtid pus, about the consistency of paste. I injected into this sinus, with force enough to make it reach all the cavities, about two ounces of dilute chromic acid. I held this in with considerable pressure for about five minutes, when I let the pressure off and let the surplus acid run out and away. After about six days I made an exit at the bottom of this cavity for drainage, and it made a nice recovery and the fœtor was soon dispelled.

I think these cases will suffice to show the great value and somewhat the line of therapy to which chromic acid may be used with success and advantage. A few general remarks now and I will leave the subject to your consideration. Great care must be taken in the use of this drug, that it does not injure you, my dear doctors, for the strength I have recommended would quickly burn your flesh severely, almost on instant contact. But still I am not so exact in its dilution when I use it, for very frequently I make the dilution by guess, and have never had any mishaps, save one instance where an attendant wiped the solution from a sore which I treated and would not wash his hands as I directed him. Soon after his hands were covered with blisters about the size of a large hulled pea. I applied glycerine to his hands, and they were soon well—again showing its great antiseptic powers.

I need not caution any one who reads the therapy in the U. S. P. not to connect chromic acid with glycerine, for he will see it is thus a violent explosive. I use this agent anywhere where I want to produce a quick slough, for it leaves a nice, smooth, clean, healthy granulating surface that heals very readily. It is almost painless in action and hence is better in

many places than the knife and far better than such caustics as arsenic, caustic pot., butter of antimony, corrosive sub., etc.

I have thought of this drug in connection with the treatment of actinomycosis, but have never tried it, but I firmly believe it would prove successful in ninety per cent. of cases. I find in treating actinomycosis we want a remedy that will penetrate fully three-sixteenths of an inch into the hardened tissues to make a successful cure, and this is the drug best suited, it would seem.

I have dissected actinomycotic tumors from a great many cattle, have dissected many a fistula and have once removed a piece of the jugular vein with success, and indeed am rather fond of surgery, but for the places and diseases for which I have recommended chromic acid I prefer it to the knife, in most cases.

I have thought of chromic acid as a possible remedy for lice, both on animals and fowls, and as a wash for the walls of houses for the same and as a disinfectant and deodorizer. Try it.

REPORTS OF CASES.

"Careful observation makes a skillful practitioner, but his skill dies with him. By recording his observations, he adds to the knowledge of his profession, and assists by his facts in building up the solid edifice of pathological science."

SOMETHING THAT MAY BE OF INTEREST TO THE YOUNGER PRACTITIONER.

By J. F. De Vine, D.V.S., Rhinebeck, N. Y.

In recording the following cases, I do not do so with the idea that it is of any interest to the older members of the profession, who have had many similar cases, and were too busy, or perhaps, too indolent to write them up, and send them to our journals, that we who are still children might know something about the circumstances which accompany these cases that are "a little off color." I know there are students in our senior classes to-day who are doing as I have done, after pondering over Fleming's or some other foreign work, will lay the book

aside, and say to themselves: "There is no use of reading up these things, we never meet any of them in this country," but we do have them, the older practitioner is neglectful, and the younger too timid to record them.

Anidian Monster.

On Dec. 27, 1899, I was called to J. S. Huyler's, at Hyde Park, N. Y., to look over a herd of cattle which had been carred in from the West. As I passed along behind the herd I noticed a portion of the placenta hanging from one of the cows. On questioning the attendant I found that she had calved two days previous, but the retained placenta did not occasion much attention, the fœtus being so small. After I had loosened the fœtal membranes from the fundus and left cornua of the uterus, it still was very adhesive to the floor of the right cornua. After manipulating it a few minutes I found that it felt very bulky, and that it had a diffuse attachment instead of a localized one, which, however, I loosened, causing very little hæmorrhage. It consisted of a fleshy mass, dark red in color, and weighed about four pounds; its shape was much like a robin's nest, having a depression in the centre or top and containing a turbid fluid, and what appeared to be the fœtal membranes, nourished by an imperfect umbilical cord.

The after treatment consisted of a 2 per cent. creolin douche twice daily for two days, when the os had closed and recovery was complete.

Bovine Monstrosity.

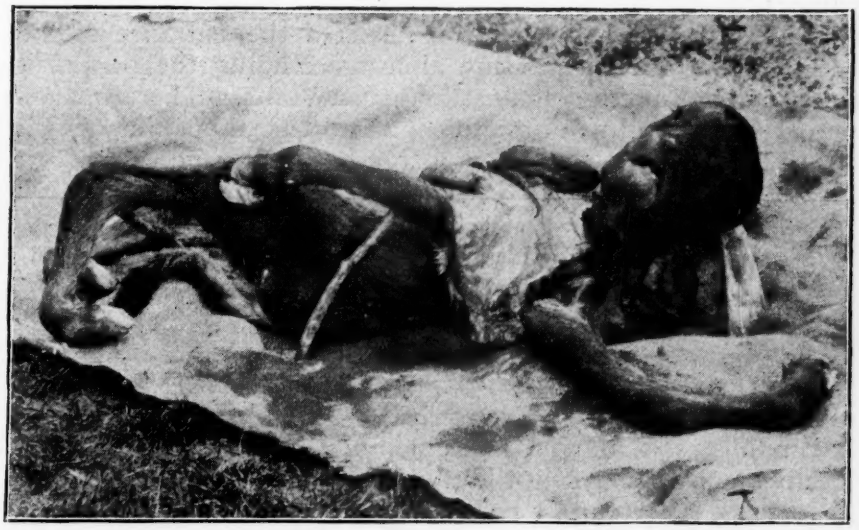
On April 2d, a client came to my office and told me that one of his cows had given birth the day before to a calf which he thought might be of interest to me.

I drove to his place that afternoon and after looking the individual over I had it photographed, laying it on its side and taking a ventral and dorsal view, which I enclose. I then placed his "nibs" on one side and Fleming's on the other, and after guessing a half-hour or more I called it a Perosomus Horridus.

I will now describe it as best I can.

As will be seen by the accompanying photo, there was a complete torsion of the body, the hocks being replaced by two perfect knees. The cranial cavity was twice its natural size, the meninges protruding through a large opening at base of skull, containing a serous fluid with a few floating particles of white and gray matter.

The thoracic cavity was devoid of lungs; the abdominal cavity presented a small vacuum, all of the viscera protruding



through the umbilicus and having attachments to the right thoracic region and shoulder, all of which appeared normal, excepting the kidneys, there being only one, which was somewhat hypertrophied.

STRICTURE OF THE URETHRA IN A FOX-TERRIER DOG.

By Roscoe R. Bell, D. V. S., Brooklyn, N. Y.

A large fox-terrier dog was admitted to the hospital with the history that he made persistent efforts to urinate, but that only a small quantity passed after considerable straining. He was placed under observation, and it was found that he would stand stretched as though endeavoring to pass urine for ten or fifteen minutes, when a few drops would be expelled. The catheter came in contact with an obstruction just before turning the ischial arch, and the smallest flexible probe would go no further. An operation was decided upon, but his owner being absent from the city, it could not be undertaken until her consent was obtained, as the prospect was that an artificial opening would have to be made on the vesical side of the stricture, which it was believed to be. While waiting for an answer from the owner, the dog collapsed in great pain, and laid upon his side groaning and howling. Knowing that his bladder had ruptured he was chloroformed, and a post-mortem held. The walls of the bladder were black with inflammation,

thicker than normal, and exhibiting a tear an inch long in its side. At the point which had checked the entrance of the catheter was found a stricture almost occluding the lumen of the canal, and pressed against by urinary salts. There was apparently but one line of treatment: an artificial opening, which if undertaken earlier would probably have been successful.

EXTRACTS FROM EXCHANGES.

FRENCH REVIEW.

LAMENESS FOLLOWING AN ABSCESS OF THE MASTOIDO-HUMERALIS [*By Mr. Carougeau*].—A heavy draught horse had an abscess of the left mastoido-humeralis, for which he was treated, and recovered in the usual length of time. Some two years later, he gradually became very lame in the left fore leg. The pain was very great; the animal could scarcely put any weight on the lame leg, walking on three legs, and on the lower part of the neck, a little above the point of the shoulder, there was a slight swelling, which to be carefully examined required means of control (twitch). The left mastoido-humeralis was invaded with a very thick induration measuring 20 centimetres in length and occupying the place where the abscess removed two years before had existed. This indurated tissue was the cause of the lameness, pressing on the nerves of the region. Its removal was essential to recovery. The animal was cast, the parts disinfected, a large incision made through the skin, and the indurated portion of the muscle excised, carefully avoiding the blood vessels of the jugular groove, which were readily seen at the bottom of the wound. The portion removed was made of very hard tissue, formed of very dense connective bands, and elastic fibres. The wound was closed with sutures and treated with antiseptics. Union took place by first intention. The condition of the patient after the operation was very suggestive; once relieved of his means of restraint, the animal was considerably relieved of his lameness, and could use his leg in standing or walking. He resumed work in ten days. —(*Journ. de Zoötech.*)

COMMINUTED FRACTURE OF THE ISCHIUM IN A HORSE [*By MM. Mather and Morey*]. — Two weeks previous this large Percheron fell on his right side upon a rock and severely bruised himself. He presents at the point of the ischial region

a swelling diffused over the right hip, with a small wound, from which escapes reddish serosity, having a strong odor, although not fœtid. Through this wound two fistulous tracts open on the outside; one of these is horizontal and runs towards the ischium; the other is vertical. This second tract is freely divided and connected with the horizontal one, and the wound thoroughly irrigated with phenic solution, 3 per cent. After five days a small splinter of bone is found loose in the wound. After a few days, as the suppuration seems to increase, the wound is again explored with a grooved probe and the finger, when a piece of bone as big as a small nut is detected with others smaller. All those are extracted, the cavity thoroughly curetted and aseptic gauze packed in the wound. The granulations developed rapidly, the cavity was soon filled, and the suppuration gradually diminishing, recovery was complete after about one month's treatment.—(*Journ. de Zoötech.*)

NECROSIS OF THE CONCHA—DEEP FISTULA—OPERATION—RECOVERY [*By MM. Cadéac and Laravoire*].—A mare was bitten on the left ear and the injury had apparently recovered, when, two weeks later, the organ became swollen and so painful that the mare could not be used. An abscess had formed, which on being opened gave escape to an oily yellowish fluid mixed with cartilaginous pieces. Notwithstanding careful attention and antiseptic treatment, the wound kept up discharging, and a fistulous tract formed, from which flowed the same oily liquid. The ear was much deformed, its point drooping gave it the aspect of the ear of a dog. As, however, the process of necrosis was keeping up and as the animal had become very irritable and difficult to handle, an operation was decided upon, in which the central focus of suppuration was freely exposed, and all the necrotic portions of the concha were removed and scraped, and a clean wound left, which was treated with solutions of bichloride of mercury and iodoform. Recovery took place rapidly, the animal remaining with an external ear smaller than on the other side.—(*Journ de Zoötech.*)

VESICAL CALCULI IN A SLUT [*By L. Colin*].—For a short time this little dog, which is very old, eats very little, has chills and breathes asthmatically, and one morning she was found dead. At the post-mortem, it was found that the lungs were emphysematous, the liver slightly cirrhotic, spleen healthy, the kidneys firm, quite red and without calculi. The bladder was empty, with mucous membrane somewhat injected, purplish towards its neck, which contains six calculi, the largest of

which was as big as a large hazel nut. The others were smaller, of large pea size. Three others are also found as small as the head of a pin. The urethra was free, and could allow only very small gravel to pass.—(*Rec. de Med. Vet.*)

ITALIAN REVIEW.

DISTOKIA DUE TO INTRAPELVIC ABSCESS [*By Dr. Augusto Otti*].—This uncommon case is interesting on account of the fact that for fear of septic peritonitis, an exploration has not been made to ascertain the nature of the cause of the difficulty. The author was called to attend a cow which had had five calves before, always without trouble, and this time was unable to deliver. The fœtus was in anterior presentation, vertebro-sacral position, but its expulsion was prevented by a large swelling, which from about 25 centimetres from the vulva extended forward, and, as it proved to be at the autopsy, as far as the psoas region. Embryotomy was almost impossible, and as the cow was losing ground, it was decided to have her killed. At the autopsy the fœtus was found in the uterus, and alongside of it on the left an enormous swelling, ovoid in shape, 50 centimetres in length, and 25 on its transversal axis, it containing clear yellow, creamy granular pus. The corresponding ilio-pectineal crest was diseased, the peritoneum surrounding adherent by circumscribed spots of inflammation.—(*Nuovo Ercolani.*)

ENORMOUS CERVICAL TUMOR IN A HORSE [*By Dr. G. Gambarotto*].—At the clinic of the Veterinary School of Turin, an old gray horse was presented, which on the left side of the upper part of the neck, in the triangle of Viborg, presented an enormous growth which had begun by a small nodule, and was now twice as large as a man's head. On its external surface it was here and there ulcerated, and presented various colors on different places. It looked like melanosis in some parts. It being pedunculated, its removal with elastic ligature was decided upon, a strong rubber tube was applied. After a few days this tube was changed, and the slough then took place without hæmorrhage. The tumor weighed 5355 grammes, measured 0.16 centimetres in one diameter, 0.49 on the other. Under the microscope it proved to be a melanotic fibrous liproma.—(*Il Moderno Zooiatro.*)

RUPTURE OF THE SPLENIC VEIN IN A HORSE [*By Dr. A.*

Serra].—Called to attend a horse that exhibited very violent pains, he found him attended by an empiric, but presenting such symptoms that he informed the owner that the subject was dying, and waited only to make the post-mortem. On opening the abdomen a large quantity of blood escaped from it. The spleen was found the seat of markedly developed varicose condition of the splenic vein, which at a given point had given way and produced a fatal hæmorrhage. The case is exceedingly rare, and according to the author, no similar one has ever been recorded.—(*Il Moderno Zooiatro.*)

TREATMENT OF PURULENT MAMMITIS [*By Th. Magnus*].—Frequent among cows kept in the fields, this disease is accompanied with loss of flesh, which is very detrimental to those animals. The diseased process increases from the difficulty of rational treatment, the animals being kept loose and not seen for two or three days. To facilitate the escape of pus, the author has resorted, with success, to a treatment which has but little objections, the loss of the milky secretion being of secondary consideration in animals which are raised for beef. He amputates the teat, at its base, and opens freely the galactoferus sinuses. There is but little hæmorrhage, and if it keeps up, it is stopped by plugging. Partial amputation is not as successful as when the entire teat is cut off. After a while, the swelling of the udder subsides and the animal takes on flesh.—(*Giorg. de la reale Soc. Vet., Bulletin Veter.*)

PARALDEHIDE IN VETERINARY PRACTICE [*By Th. Magnus*].—By its chemical properties, paraldehide stands between alcohol and ether. Diluted in 10 parts of water, or mixed with glycerine, it has a special odor and acts as an antiseptic, hypnotic and slightly diuretic. An animal is put to sleep with it with difficulty; it acts specially on sensitive nerves, less so on motors. 30 grammes given in capsules will permit the painless operation of castration done standing. Another animal which received 75 grammes was trephined without any pain. The operation lasted 15 minutes. The horse exhibited only slight depression and wabbling gait afterward, but those disappeared after an hour. In a fistula of the withers, where 90 grammes had been given, an incision was made 14 inches in length, and two dorsal vertebræ scraped without pain. After 15 minutes the odor of the drug was detected in the expired air. The author prefers it to cocaine when the field of the operation is quite large and the manipulations are to last some time.—(*La Riforma Veterin. Bullet. Vet.*)

A CASE OF CYSTICERCUS BOVIS [*By Dr. Ricc. Bardoni*].—In 17 years of practice in public abattoirs, this is the second case observed by the author. He observed the first in a steer, the second in a calf. The vesicles were very abundant in the heart; in fact, literally stuffed with them. These were also in the deep muscles of the thigh, the masseters, those of the neck and of the scapular regions. Most careful examination failed to find any in the brain, liver, spleen or lungs. The carcass was destroyed.—(*Clinic. Veterin.*)

DEPARTMENT OF SURGERY.

BY L. A. AND E. MERILLAT,
of the McKillip Veterinary College, Chicago, Ill.

ABDOMINAL SURGERY.

There are a number of operations included in abdominal surgery that are frequently indicated in domestic animals; and when the opportunity presents itself, the veterinarian should not neglect to take advantage of such favorable and convenient means of bettering and ameliorating the condition of his patient by surgical interference. In large domestic animals (equine and bovine species) such operations are seldom attempted, owing to the lack of proper methods of restraint. Such animals as the horse or ox, with their well developed muscular system, and their natural propensity, tendency and determination to fight restraints, which are the chief objections to such procedures, are generally considered subjects not adapted for favorable results from such operations. Prior to the correct understanding of aseptic measures in such instances, the general belief was that the peritoneum of these animals was very susceptible to infection, and any surgery that involved it should not be undertaken; but this is not the case; if the proper methods of restraint could be applied to these patients, laparotomy would be as common in veterinary surgery as it is in human surgery; but so long as the veterinarian has no substitute for, or appliance to take the place of, the straight-jacket, sleeves, sheet or good, strong, trustworthy attendant, just so long will the results of such operations continue to be unfavorable, but when convenient means of securing these patients are obtained, the percentage of recoveries will be as encouraging as if the patients in question were of the *genus homo*, or some

other *small genera.* In these operations it is necessary that the patient be kept quiet for some time after the operation, in order to get desirable results from them; so it can be readily understood that there are great disadvantages to be overcome in restraining such animals as the horse, whose strength and conformation make him a difficult animal to handle in a recumbent position, and when necessity demands that he be kept quiet and in one position for some length of time; besides, we know that such animals should not be kept in one recumbent position for more than five or six consecutive hours without expecting additional injury or complications to follow. Every attempt of the patient to change his position, even when assisted, inflicts severe injury to the wound; tearing the stitches, pulling the edges of the wound apart, and favoring infection. It is easy to comprehend why such operations as laparotomy and celiotomy are not more frequently performed by veterinarians; yet with all the disadvantages and contra-indications that can be enumerated against such surgical interference, there are, nevertheless, instances when such operations should not be avoided, even though the percentage of recovery is low.

In the horse, the indications for abdominal surgery usually follow accidental wounds that penetrate the abdomen and injure some of the organs which it contains. These wounds require surgical attention for the purpose of removing foreign substances which may be introduced into the wound at the time of the accident; to irrigate, cleanse and make the wound aseptic, or, to ascertain the extent of the wound, and to repair the damage done to the parts involved, and to establish drainage; besides, there are conditions that interfere with normal functions and produce pain (celialgia and enteralgia); abscesses resulting from traumatisms; pathological and anatomical structures to be removed from the abdominal cavity, together with other conditions which are only revealed by opening the abdominal cavity (celiotomy), a procedure to which the veterinarian seldom resorts.

For the sake of convenience we shall divide the indications for abdominal surgery in domestic animals into two classes:

1. *Indications for abdominal surgery* in which the cause of the condition requiring surgical attention can be determined without exploring the abdominal cavity; under this classification we will consider the following conditions common to the horse, viz.:

(*a*) Punctures into the abdomen of runaway and unmanage-

able horses that plunge into fences, vehicles and pointed objects which penetrate the cavity, inflicting wounds complicated by visceral injury; punctures resulting from broken ribs which often follows falls, kicks and other forcible blows; horses gored by cattle in pastures, barnyards and stables used in common, and gunshot wounds in which the abdominal cavity has been entered.

(*b*) Abscesses resulting from traumatism and those which follow "tapping" (paracentesis) of the abdominal cavity or punctures of any kind which have not been properly treated.

(*c*) Strangulated herniæ, and herniæ containing a loop of intestine (enterocele); castration of ridgeling (cryptorchids); spaying of mares (ovariotomy), and the removal of a fœtus which cannot be delivered otherwise (Cæsarean section).

2. *Indications for abdominal surgery* in which the condition requiring surgical attention cannot be ascertained without exploring the abdominal cavity; under this classification the following conditions may be mentioned:

(*a*) Extra-uterine pregnancy (celiocyesis); tumors in the abdomen (celioncus), or in the intestines (enteroncus).

(*b*) Rupture of intestines (enterorrhesis); suppuration in the abdominal cavity (celiophyosis); toxemia from contents of intestinal tract (enterosepsis), and dropsy of the peritoneum (ascites).

(*c*) Volvulus, intussusception or invagination; occlusion by accumulation of fæcal matter in the intestines (coprostasis), and strictures of the intestines (enterostenosis).

(*d*) Pain in the abdomen (celialgia), or in the intestines (enteralgia); disease of intestines (enterosis); floating kidney (nephroptosis); foreign bodies, calculi and concretions in the intestines, and strangulated herniæ.

In ruminants, the indications for abdominal surgery are more common and the results following such operations are more favorable than in the horse, and no veterinarian should hesitate to undertake such operations as laparotomy or celiotomy when the opportunity presents itself, for the effects resulting from such operations are usually flattering. The conditions which require surgical attention in the ox may be classified as in the horse.

1. *Conditions* which can be determined without exploration, may be considered as follows:

(*a*) Accidental wounds, punctures and gunshot wounds which penetrate the abdomen.

(*b*) Abscesses that result from tapping, punctures and wounds that have not been treated properly.

(*c*) Impactions of the rumen that cannot be evacuated without a surgical operation (rumenotomy).

(*d*) Strangulated hernia, enterocele, cryptorchid, ovariotomy and Cæsarean section.

2. *Conditions* which cannot be ascertained without opening the abdomen and exploring, may be classed as follows:

(*a*) Tumors located in the abdomen or intestines and extra-uterine pregnancy.

(*b*) Rupture of intestines, suppuration in the abdomen, toxemia from contents of the intestines and ascites.

(*c*) Intussusception, invagination, volvulus, coprostasis, occlusion, strictures and dilatations are conditions that are very common in the ox, and which can be treated more successfully than in the horse. *Foreign bodies*, such as clothing, blankets and other substances which cannot be disintegrated by the process of digestion; *bezoars*, which are intestinal calculi common to ruminants, and *hair balls* (ægagropilæ), which are formed in the intestinal tract by the accumulation of hair swallowed by the animals during the time that they are shedding, are often found in the intestines of ruminants, and can be located by an exploration of the abdominal cavity.

In carnivora, abdominal surgery is more frequently indicated than in any other domestic animals, and, in fact, are subjected to more surgical operations requiring laparotomy than either man or domestic animals. Most of the operations included in human abdominal surgery are tried, perfected and improved by using the canine species as a subject; and many of the blessings that man enjoys from the relief of pain, distress and oppression alleviated by surgical measures, are the results of operations whose technique has been improved, substantiated and simplified by such experimental surgery.

The veterinary surgeon should never neglect or refuse to operate upon a dog or cat when such operations are indicated, for prompt and vigorous action in such cases will often save the life of the patient, and elevate the operator in the estimation of his client. We shall class the conditions in the dog, that require surgical attention in the same manner as before, viz.:—

1. *Conditions requiring surgical attention* that can be determined without laparotomy, and which can be enumerated as follows:

(*a*) Punctures resulting from chases through clearings, thickets or coppice; wounds inflicted by teeth of other carnivora; dogs gored by cattle, and gunshot wounds.

(*b*) Foreign bodies that are known to have been swallowed, and not passed with the fæces or vomited; these may be marbles, pebbles, coins, balls, nails, corks, sticks or anything with which the animal is in the habit of playing.

(*c*) Herniæ in which the radical operation is indicated, and those which cannot be reduced without surgical interference; spaying of bitches, and the removal of the fœtus when it cannot be accomplished otherwise.

2. *Indications or conditions* revealed by laparotomy.

(*a*) Celioncus, enteroncus, nephroncus, and celioclyesis.

(*b*) Enterorrhesis, celiophyosis, and enterosepsis.

(*c*) Coprostasis, enterostenosis, and occlusions caused by foreign bodies, invagination, volvulus, or strangulated hernias.

(*d*) Celialgia, enteralgia, enterosis and nephroptosis.

Before "taking up" the surgical diseases of the abdomen, stomach and intestine, we shall consider the sutures commonly employed in abdominal and intestinal surgery, which will be followed by a description of each of these operations with special attention given to those commonly indicated in veterinary practice.

INTESTINAL SUTURES.

Here and there the veterinarian finds it necessary to perform intestinal operations, and should as a consequence be familiar with the technique of intestinal anastomosis. In the larger domestic animals such capital procedures can rarely be carried to a satisfactory termination, but in the smaller ones—the canine, feline and porcine species—they are attemptable.

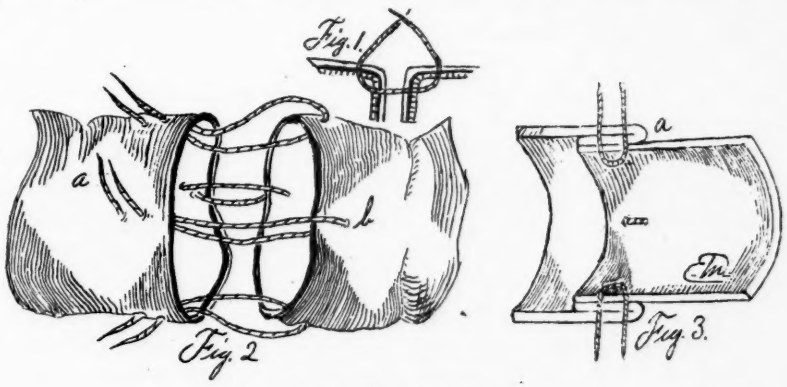
The methods of effectually re-establishing permanent continuity in the intestines are numerous. Each prominent surgeon adheres more or less to a certain one of these methods, which vary only in details. The Murphy button, the decalcified bone button and the sutures all serve the same general purpose of bringing the peritoneal coats of each end together, in perfect contact, while the cut edges are kept in the lumen of the intestine. The edges may then slough off and pass down and out with the contents of the bowels, while the serous coat, noted for its rapid proliferation, soon safely unites. The button method is no longer considered indispensable, since it has been shown that end-to-end unions and anastomoses can be safely accomplished without them.

Before attempting such operations the bowels should be emptied as much as possible and the peristalsis suspended with opium. If there is any septic matter in the cavity it must be well irrigated; the sutures must be pure beyond doubt, and should never pass through the three coats of the intestine on account of the danger of infection from the contents of the bowels; for stitch suppuration will surely prevent a favorable termination.

The sutures used in intestinal approximation and anastomosis or in such operations as enteroraphy and enterostomy should be made with a curved needle, and the ligatures used in each of the above mentioned procedures should be selected as follows: (1) Catgut for stitching the serous coats and (2) silk when close apposition is desired and firm sutures required.

(1) In stitching the serous coats, catgut should be used because it is readily absorbed and leaves no ligature sinuses which are often the cause of much trouble after such operations. It should be carefully sterilized, being more difficult to disinfect than silk, therefore special care should be given to this proced ure; for it is generally conceded that a large percentage of failures in these operations is due to stitch suppuration, which can in no way be avoided but by the adoption of correct aseptic methods and the proper selection of sutures.

(2) Silk sutures may be used, and in fact are preferred in stitching the edges of the surgical wound, which slough and



JOBERT'S SUTURES.

FIG. 1. Stitch used for suturing intestinal incisions.
FIG. 2. Jobert's invagination suture.
FIG. 3. Jobert's method of approximation.

pass off with the contents of the intestines. In such instances, the stitches are required to be more firm and reliable than cat-

gut sutures, which often soften and give way to slight tension, and for this reason are considered too treacherous for this series of stitches, which should be carefully and substantially applied in order to relieve the stitches that bind the serous coats together, of part of their tension. As this series of stitches are more liable to become infected from the contents of the alimentary canal than those of the periphery, and, as the silk may infect other parts of the wound with which it may come in contact during ligation, it is therefore very essential that the silk be *perfectly* aseptic, or, in other words, well sterilized.

Classification of Intestinal Sutures:—The sutures employed in these operations are usually named in honor of the originator, and the ones that we will consider in this article are, viz.:

1. Jobert's suture.
2. Lembert's suture.
3. Czerny's suture.
4. Chaput's suture.
5. Czerny-Lembert suture.

Each of these has been tried by many surgeons and their respective merits noted. In some cases the more simple ones prove very satisfactory, while in other cases, and apparently under the same circumstances, have been found very unsatisfactory; however, the most efficient suture known thus far is a compound, or rather a combination of two simple ones (Czerny-Lembert suture, Figs. 4 and 5), which we shall describe later in this article; but at present it suffices to note that each method of suturing has its indications and contra-indications; its advantages and disadvantages; and that each operator should choose the method which in his judgment will give him the best result; and in selecting his method of suturing, he should consider the health and general condition of the patient upon which the operation is to be performed. Susceptibility to infection, and the power of endurance of the patient, are also important factors to be considered, before the method of procedure is adopted and the operation is undertaken.

In considering the merits of the different sutures, it should be remembered that some of the simple methods will answer the purpose under some circumstances, while other methods which are more complicated, requiring more time, care and efficiency to apply them properly, are not necessary to accomplish the required result, if the patient is in good condition; and in such cases, a plain and simple method will shorten the procedure and simplify the technique, which adds to the brilliancy

of the operation; but if positive results are required the best and surest methods should always be adopted.

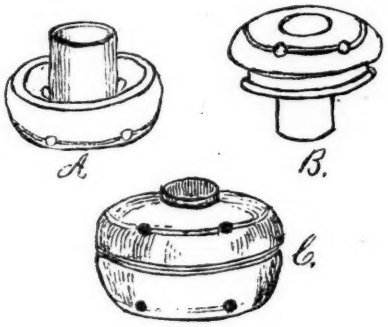
Susceptibility to infection must be given due consideration, for there are various conditions, such as gastro-intestinal catarrh, chronic enteritis, tumors, tuberculosis, abscesses near the seat of operation, which may render the surgical wound susceptible to infection by reducing the vitality of the tissues, and thus making a favorable soil for septic bacteria, which can be introduced either by primary or secondary infection. In such cases the greatest care must be taken in making the sutures, and also to prevent extraneous and autoinfection, which usually bring about an undesirable state of affairs, if not warded off by all possible precautions, and if the proper sutures are not selected and correctly applied. Dexterity and rapidity in operating is conducive, but in such cases, there are other achievements that are more desirable. "It is important to be a dextrous operator, but it is more important to be a successful surgeon."

The power of endurance. In this connection there are a variety of things to be taken into consideration, and among the most important is the power or ability of the patient to withstand shock, which, however, seldom causes death without reaction, but its severity following such operation depends greatly upon the constitution of patient. An animal may appear strong, robust and vigorous before the operation, but his condition may be treacherous, due to his possession of a certain amount of tolerance or endurance without the ability to stand additional strain and in such an instance is susceptible to constitutional disturbances following the operation.

The clinical picture which shock produces, following such conditions, is marked by a cold, clammy sweat; pale visible mucous membrane, subnormal temperature, 97° to 98° F. (peripsyxis), weak, imperceptible, thread-like pulse, sunken eyes, and a weird look. The course is usually typical, marked with uneasiness and restlessness (dysphoria), loss of coördination in walking (abasia) and standing (astasia), which is generally progressive, standing becomes difficult (dystasia), walking almost impossible (dysbasia), the pulse becomes weaker and weaker with now and then a pause, which is an indicator of death, and is soon followed by enecation.

The power of endurance is also reduced by pathological conditions, and organic diseases which gradually lower the vitality of animals. Although it is seldom necessary for a veter-

marian to expect organic or functional disorders to contra-indicate surgical interference when making his ante-operative examination; but it is advisable, when an emaciated subject presents itself in this connection to take in the whole situation, and allow nothing to pass unnoticed which may reveal itself in the form of such dreaded sequelæ as renal insufficiency, asthenia, or surgical shock.



MURPHY BUTTON.

A, and B, open; C, closed.

If the pathological conditions which have reduced the vitality of the animal are localized in the intestines and, if the surgeon concludes that immediate action would relieve and improve the condition of the patient, he should at once resort to vigorous and skillful measures, and employ such means that will economize strength and shorten the operation; and something, in the way of medication, should be administered to tone, stimulate and strengthen the depleted system. In such cases the Murphy Button would be applicable in approximation or end-to-end anastomosis, as it can be adjusted in less time than it would require to make the sutures indicated under such circumstances. (Its application will be considered under intestinal surgery.)

In weighing the respective merits of the different stitches used in intestinal approximation and anastomosis, or, in suturing surgical wounds made in the intestines, we shall consider them in the order named, and shall mention the advantages and disadvantages of each method as observed by experienced surgeons who have performed the operations in question and carefully noted the respective value of each method; and, besides, we are indebted to S. G. Burkholder, M. D. V., M. D.,

V. S., for his experience and observations in performing laparotomy upon small domestic animals, and for the valuable information received from him in this direction.

1. *Jobert's Suture.*—The stitch known as Jobert's suture is the most simple suture used in intestinal operations, and is an interrnpted stitch which is passed through all the coats of the intestine and applied as follows: fold the edges of the surgical wound inward into the lumen of the intestine and approximate them; then pass the needle through the three coats of the intestine into the lumen (Fig. 1); then through the three coats of each of the edges of the surgical wound which have been folded in and approximated, and then through the opposite side, making the point of exit the same distance from the edge of the wound as the point of entrance.

The distance between the stitches should not exceed five or six millimeters, and, in some cases, should be even less. It is necessary, however, for the operator to use his own judgment as to the proximity and tension of the stitches, and especially as to tension, for it is absolutely necessary to have uniform tension of stitches in all intestinal operations, no matter what method of suturing is adopted.

This method has its advantages and disadvantages. The fact that each stitch comes in contact with the contents of the alimentary canal is the greatest objection to the method, and the rapidity with which an operation can be performed by this method of suturing is one of its advantages. In approximations or end-to-end anastomoses, these stitches are easily applied, and if the intestine is not involved in any serious pathological condition, and it is desirable and advisable to shorten the operation, this method can be used to a fair advantage; however, the result is not certain and should not be used when it is convenient to apply a more reliable suture.

Jobert describes a method of making intestinal approximations (Fig. 3) which consists of stitches made in the same manner as those just described; but in this case only one end of the intestine is folded inward and the other is inserted into it, which brings the two serous coats together; the stitches are then passed through all the coats of both ends into the lumen and out again. This method is not advisable, as it is difficult to encourage synulosis sufficiently to make good, reliable unions, for there are two in this procedure (Fig. 3-a): one between the two mucous surfaces of the end that is folded inward, and the other between the serous coats of the two ends. The mucous coats do not

unite as readily as the serous, and if the sutures are made of catgut, which usually slacken in a short time, and leave a wound in the mucous surface exposed to infection from the contents of the alimentary canal.

A third method has been described by him which is known as the Jobert's invagination suture (Fig. 2). In this procedure both ends are folded inward, and the stitches are made by passing the needle through all the coats into the lumen of one end from without inward, then through the other end in the same manner, then through the first end about four millimeters farther from the end than the point of entrance; and when the required number of stitches have been applied they are ligated, which brings the one end into the lumen of the other end of the intestine to be approximated. This invagination method is not a very reliable way of reëstablishing continuity in intestines of domestic animals, although it is a very ingenious procedure.

(*To be continued.*)

SURGICAL "NEVERS."

1. Never operate without securing your patient properly.
2. Never operate too soon, nor postpone an operation too long; operate at the proper time.
3. Never operate without exhausting every possible means of making a correct diagnosis.
4. Never abandon an operation before accomplishing your purpose.
5. Never operate without familiarizing yourself with the operation to be performed.
6. Never foster dexterity at the expense of judicious technique.
7. Never neglect to have your operating room equipped with a good casting apparatus, side-line, extra ropes, twitch, hobbles, stocks; and clean straw, shavings or mattresses on the floor.
8. Never operate in a dark or ill-ventilated place.
9. Never keep your client in ignorance of the sequelæ that may follow an operation.
10. Never expect *fin de siècle* methods of surgery to be successful without some exertion on your part to make them so.
11. Never cast an animal without sufficient help to do the job properly.

12. Never cast an old animal without warning all parties interested as to the danger of injuring such animals.

13. Never cast an animal in the advanced stage of pregnancy, unless the patient's life depends upon the operation.

14. Never perform an operation requiring delicate manipulation without the aid of an anæsthetic.

15. Never administer an anæsthetic without first considering the condition of the patient, nor without preparing the patient for the ordeal; except in emergency cases, which are comparatively rare in veterinary practice.

16. Never keep an animal under the influence of an anæsthetic for more than an hour.

17. Never administer a general anæsthetic when a local one will do as well.

18. Never fail to consider the danger of receiving physical injury while performing operations. A kick from a horse, a hook from a cow, a bite from a dog or a scratch from a cat, all reflect upon the surgeon's efficiency.—(*E. M.*)

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This new volume of the Veterinary Encyclopedia of Professor Cadéac is composed of two parts essentially distinct, the Pharmacology, by M. Delaub, of the Toulouse Veterinary School, and the Toxicology, by M. Stourbe, of Alfort.

In the *Pharmacology*, after some general remarks, we find two parts—gallenic pharmacology, with the art of prescription writing, and chemical pharmacology. In the first, we observe interesting remarks on the surrounding conditions that may influence the properties of indigenous drugs. The various pharmaceutical manipulations are carefully described. The drugs are classified according to their pharmaceutical forms: powders, solutions, electuaries. The study of each of these forms includes, first, some preliminary information, then as examples or records a great number of prescriptions taken mostly from the National Pharmacopœia.

The order followed in the chemical pharmacology is atomic classification. The article referring to each substance is div-

ided into various parts: synonyms, properties, specific character, comparative character, preservation, action, indications.

Toxicology is divided into two parts:—The first includes definitions, an interesting historic, legislative classification of poisons and preliminary tests.

The second part, or *special* toxicology, is a most complete study of the various poisons. The author does not only tell how to look for them, but exposes their action on the organism, symptoms, character of autopsies, etc. However, the enumeration of the chapters of each subject will show the toxicological study of each one: generalities, modes of absorption, toxic doses, absorption, circulation, elimination, symptoms, lesions, prognosis, treatment, etc. Some poisons of special importance are the object of extensive consideration, such as prussic acid and compounds, phosphorus, atropine, strychnia, copper, lead, mercury, arsenic, antimony, carbon dioxide.

Altogether, this book, written in a clear and elegant style, neatly put up, contains, under a well arranged form, all the necessary notions of the two branches it treats of.

COLLEGE COMMENCEMENTS.

ALUMNI ASSOCIATION N. Y.–A. V. COLLEGE.

The commencement exercises of this college will be held in conjunction with the Medical Department of New York University at the Metropolitan Opera House, Broadway and Fortieth Street, New York, June 7, at 8 P. M.

The banquet of the Alumni Association of the Veterinary Department of New York University (consisting of the alumnæ of the American Veterinary College and the New York College of Veterinary Surgeons) will be held at the Hotel Marlborough, Broadway and Thirty-sixth Street, June 7, at 11 P. M.

It is earnestly hoped that a large reunion of the alumnæ of these two schools will attend, since the interests of their alma maters having been cemented, a closer acquaintance and friendship between individuals will undoubtedly prove a pleasant and profitable occasion. Those who expect to attend should at once notify Dr. H. D. Hanson, 160 Eldridge Street, or Dr. C. E. Clayton, 153 W. 54th Street, New York City.

DR. R. C. MOORE has been appointed Assistant State Veterinarian for Kansas City.

CORRESPONDENCE.

THE "JOURNAL" AND THE PUBLICATION COMMITTEE OF THE A. V. M. A.

ITHACA, N. Y., May 22, 1900.

Editors American Veterinary Review:

DEAR SIRS:—The March *Journal*, which, owing to the lateness of the season, came out in May, makes an unwarranted attack upon the Publication Committee in the following words: "Some papers of much importance, specially prepared for the New York meeting, are omitted entirely, others are severely abstracted, while the discussions as reproduced fail very much in many instances of being faithful reproductions of what was said and discussed."

Each of the three charges are malicious falsehoods.

No *papers* were, but only a *paper* was omitted entirely. When the senior editor of the *Journal* presented his paper at the meeting the chairman of the committee immediately requested it, but was denied, and the paper retained until the *Journal* editors knew the proceedings were in print, apparently for the purpose of trumping up false charges.

Neither were *papers* abstracted either "severely" or mildly. In *one paper* the author had introduced a large amount of irrelevant matter which had no connection either direct or remote with the title of the paper. This irrelevant matter being in a block, the entire block was omitted without disturbing the symmetry of the paper, and without losing a sentence, thought or word which had any relation to the title of the paper. This was completely within the committee's jurisdiction, was a kindness to the author, and a saving in money and in scientific value to the association.

The third charge of unfaithfulness in the reproduction of discussions reaches the acme of blind malice. The committee employed a competent stenographer, who very promptly delivered typewritten copies of all discussions in duplicate, and one of these copies designed for and used by the printer was handed to each participant in the discussion for correction and *every discussion was printed just as corrected by the speaker himself*, except in matters wholly unimportant, like some business discussions, which were edited and the bare record of the actions inserted.

Errors there were, they always occur, and the committee sin-

cerely regrets them, but after a lapse of several months we have failed to find any serious errors of fact either in omission or commission, nor has any member, or even the hypercritical *Journal*, pointed any out.

The *Journal* is specially sensitive upon the question of the publications of the proceedings of the A. V. M. A., and has never approved the character of the publication except when edited by the *Journal's* editor, and *printed by the Journal's printer.*

Any member will readily understand the *Journal's* sensitiveness by a perusal of the committee's report for 1897 on page 28 of the proceedings.

It took three years of editing and printing proceedings by the *Journal* to bankrupt the association, and the proceedings appeared in from 6 to 18 months after the meetings. The proceedings were better edited and printed perhaps; surely the work took long enough time and cost enough. It cost so much that a special assessment of $5.00 per member was levied, and failed wholly to meet the deficit, and obliged the association to go without printed proceedings for two years. It cost serious disaffection in the association, and an appalling decrease in membership. Under the retiring committee the expenses of publication have been so far reduced that the deficit from previous recklessness has been paid, and a good surplus accumulated in the treasury, and the annual dues reduced 40 per cent. Printing which with the *Journal* cost $1.60 to $1.68 per page is now done at 96c per page. The same binding for which the *Journal* extorted 50c per copy, is now done at 18c. Proceedings that required a year for the *Journal* to issue now appear in 60 days. But the *Journal* is not happy. Apparently it imagines it time to again get hold of association finances as there is a good surplus in the treasury.

But before it again acquires control we would suggest that it render an accounting for nearly $200 of association funds, which were alleged to have been expended for the printing of a quantity of proceedings by the *Journal* printer, and which have never been reported as having been seen except by the *Journal's* editor.

It would be interesting also to know if the *Journal's* editors, in case of renewed access to association funds, expect to revert to their former method of attending association meetings with a few of their boon companions in a special car, and using association funds to pay the bills.

W. L. WILLIAMS,
Ex-Chairman of Publication Committee, A. V. M. A.

PERINEPHRITIC ABSCESS—POSSIBLE PARASITIC ORIGIN.

NEW YORK CITY, May 22, 1900.

Editors American Veterinary Review:

DEAR SIRS:—I feel impelled to make a few observations in regard to the article detailing a case of perinephritic abscess with hæmorrhagic nephritis, published in your valuable monthly of this month, on page 113. I am surprised not to find a single word in that article as to the possible parasitic origin of the pathological alterations mentioned. The post-mortem report appears to be rather incomplete, as nothing is mentioned about the other internal organs, including the blood vascular system.

As far as the etiology is concerned, I am very strongly inclined to believe that the pathological alterations of the kidney were either due to primary parasitism within the kidney (*strongylus gigas*) or due to verminous thrombosis of the renal artery or some other artery—for instance, anterior mesenteric artery, or cœliac axis, the latter two possibilities also being capable of producing embolic infarcts of the kidney, followed by formation of one or more abscesses.

I think that every veterinarian who is acquainted with the natural history of *strongylus armatus* and the frequency of this parasite in horses, and the possible consequences it is apt to produce, will agree with me as to the chances of the etiology of the case in question.

The possible injury which is mentioned as a probable cause seems to me a little far fetched, especially when we consider the well protected anatomical location of the kidneys in horses.

I cannot approve of leaving the diagnosis of such an interesting pathological anatomical case to an M. D., as medical men are not supposed to know much about special pathology in horses. Of course, it is too bad that pathological anatomy is such a weak point with a majority of our veterinarians, and that as a consequence medical men are called upon.

Yours respectfully,

DR. WILFRED LELLMANN,
Professor at N. Y.-A. V. C.

FLUSHING, N. Y., May 25, 1900.

Editors American Veterinary Review:

DEAR SIRS:—I have read with a great deal of pleasure the interesting and life-like descriptions of Dr. Ellis' case of a perinephritic abscess, as reported in your last issue, but I believe that the cause is not of external origin but of internal. I ad-

mire his way of gradually arriving at his diagnosis in locating the disease in the kidneys, but I would have gone one step further and diagnosed an aneurism as the cause, to which all the clinical symptoms pointed quite plainly. This aneurisma vermicosum, caused mostly by strongylus armatus, is commonly confined to the anterior meseuteric artery (producing embolic colics), but occasionally involves the abdominal aorta, renal arteries and kidneys with tumor-like dilatations of enormous volume.

Whenever our American veterinary colleges will have regular courses on post-mortem examinations by veterinary pathologists instead of human pathologists, such elaborately worded mistakes as that emanating from the Carnegie laboratory will no longer happen. But I hope that Dr. Ellis will continue to favor the readers of the REVIEW with his interesting clinical observations and lucid descriptions. OLOF SCHWARZKOPF.

THE TREATMENT OF AZOTURIA.

COLUMBIANA, OHIO, April 30, 1900.

Editors American Veterinary Review:

DEAR SIRS:—I think we can treat azoturia more successfully now with the normal saline solution, in addition to the iodide of potassium. In the New York *Medical Record* of April 14 there is an article by R. C. Kemp, M. D., on "Hypodermoclysis," which I read, and on the next day I visited a mare which had been down with azoturia since the evening before, she being two miles out of town. I was giving her the iodide of potassium treatment, as I had read it in the REVIEW. I had also given her on the previous evening a quart of linseed oil. On Monday (third day from attack) I prepared a solution as follows: sodium chloride, one dram; boiled water, one pint, which was percolated. I used my parturient paresis apparatus (funnel and tubing), with a large veterinary hypodermic needle attached to the tubing. I had an assistant fill the funnel and tube to force all air out. The solution was about as warm as the hand could bear, as it gets cool in passing through the apparatus. I forced the needle under the integument in the iliolumbar region, using massage to the muscles to distribute it, and forcing in one pint of the solution, repeating the operation on the opposite side. In a short time the animal was very thirsty. I had drawn the urine prior to the injection. The injection seemed to assist the action of the kidneys; she rested better, and could turn herself and tried to get on her feet, but

the owner kept her lying. The next morning she was up before I got there.

I have had two cases die, and the third one was down for fifteen days, then stood up very well for two or three days, but now both stifles are affected with atrophy. Have injected strychnia and sodium chloride and used electricity, but with little benefit. She will only stay up five minutes at a time.

I had four cases that were down with azoturia, and five that remained on their feet. All that were down had badly congested kidneys, for you could see the casts under a high-pressure microscope; also crystals of uric acid, oxalate of lime and phosphate of lime, and plenty of albumen. Now, Dr. Kemp says the casts and albumen decrease by using the salt solution.

I should like some other veterinarians to try this and report their experience. Fill the cellular tissue full. I intend to put in one gallon in the next case. Yours very truly,

J. B. CAUGHEY.

SOCIETY MEETINGS.

CHICAGO VETERINARY SOCIETY.

The regular monthly meeting of the society was called to order by President Hughes on Monday evening, April 9, in hall 912, Masonic Temple. Twenty-five members of the society were present and a very interesting evening was spent.

After the regular order of business, Dr. L. A. Merillat presented the following contribution on

"BELLADONNA."

Official belladonna is the root or leaf of *atropa belladonna*, a native plant of continental Europe. In its wild state it thrives best amidst rubbish, around old ruins, along old walls, and especially when these places are protected by shade. It will also grow vigorously when cultivated under favorable conditions, in parts of the temperate zone. Atropa belladonna (commonly known as the deadly nightshade) is an herbaceous, perennial solanaceæ, growing to the height of about one metre, flowering with beautiful red bell-shaped flowers in July, and ripening its reddish berries in September.

The entire plant contains two alkaloids occurring as salts of malic acid, chlorophyl, wax, starch, gum, albumin, lignin, and various salts, but the United States and British pharmacopœias demand the use of the leaves and roots only. The leaves yield the alkaloid most abundantly, the root, fruit and branches

being next in importance in the order named. Chemically, botanically and medicinally atropa belladonna simulates—

(1) Datura stramonium (thorn apple).
(2) Hyoscyamus niger (henbane).
(3) Buboisia hyoporoides.

Medicinally, besides the above, it resembles—

(4) Cannabis sativa (Indian hemp).
(5) Erythroxylon coca (coca).

Botanically, we may add—

(6) Capsicum fastigiatum (cayenne pepper).
(7) Nicotiana tabacum (tobacco).
(8) Solanum dulcamara (bittersweet).

The medicinal activity of atropa belladonna depends entirely upon an alkaloid which Brandes christened atropine, and a less important alkaloid named belladonnine. Atropine is an alkaline principle with the formula $C_{17}H_{23}NO_3$. The formula for belladonnine is $C_{17}H_{23}NO_4$, containing one atom of oxygen to each molecule more than atropine.

It has been said that hyoscyamine, which has the same formula as atropine, but differs physically, is the true natural alkaloid of atropa belladonna, and that atropine is a conversion product. Chemically and medicinally atropine is identical with hyoscyamine, hyoscine, duboisine and daturine, differing only in their physical constitution. White and Wilcox state that hyoscyamine and atropine occur together in atropa belladonna but are not readily separated. Ladenburg regards daturine as nothing more than a mixture of atropine and hyoscyamine, while Von Planta found and has since proven that daturine and atropine do not differ at all. This discrepancy is, however, of no great importance to the therapist, but we should know that—

(1) Atropine is found in atropa belladonna and datura stramonium.

(2) Hyoscyamine is in hyoscyamus niger, duboisia myoporoides, datura stramonium and probably in atropa belladonna.

(3) Hyoscine in hyoscyamus niger only.
(4) Daturine in datura stramonium only.
(5) Duboisine in duboisia myoporoides only.
(6) Belladonnine in atropa belladonna only.

The useful preparations for veterinarians are—

(1) Extractum belladonnæ radicis fluidum.
(2) Extractum belladonnæ foliorum fluidum.
(3) Atropinæ sulphas.
(4) Homatropinæ hydrobromas.

The fluid extract of the leaves and the root are of uniform strength, so that it does not matter which of these two preparations is selected.

The fresh leaves and roots should contain from 2 per cent. to 6 per cent. of atropine, the average being about 4 per cent. In regard to the strength of fluid extracts, if the product is pure and reliable, it should contain .004 grams of atropine to the gram, *i. e.*, each minim should contain about 1/250 of a grain, and each fluid ounce, 1.8 grain of atropine. The fluid extract of belladonna, like many prepared drugs, varies greatly in potency, some samples being entirely wanting in medicinal activity. A prominent physician prescribed 60 grams (2 oz. bottle) of fluid extract of belladonna for a small boy to be taken in two minim doses every two hours. The boy misunderstood the directions and took two teaspoonfuls at each dose and returned in the morning for more medicine, feeling none the worse from the error. A horse drenched with one pint (280 grams) worked the following day without apparent inconvenience. When we take into consideration the "powerful" as well as the reliable effect of atropine itself, it is essential to demand some assurance of reliability in procuring fluid extracts, which the above instances show conclusively is not always reliable.

The Sulphate of Atropine.—The atropine sulphate is a very bitter, nauseating, crystalline powder, obtained by dissolving atropine in dilute sulphuric acid. It is soluble in 0.4 parts of water, and in about 6 parts of alcohol. Its formula is $(C_{17}H_{23}NO_3)_2H_2SO_4$.

The Hydrobromate of Homatropine is a white crystalline substance prepared by heating tropine ($C_8H_{15}NO$) with orytoluic acid in the presence of hydrochloric acid, and then neutralizing the product with hydrobromic acid. It was introduced into human ophthalmic practice about 1890, and is now coming into general use as a substitute for atropine as a mydriatic.

It is very expensive and will be excluded from the veterinary pharmacy for some time. It is soluble in 10 parts of water, and in 133 parts of alcohol.

Physiological Action of Belladonna.—Externally if applied with substances which are absorbed into the skin, or if applied to a wound or mucous membrane, belladonna will paralyze the terminals of sensory, secretory and motor nerves. It has a special action as a depressant to sensory nerves, and when there is

pain is therefore an anodyne. It will dilate the capillaries and lessen the secretions of the skin and mucous membranes to which applied.

Internally its action is probably more complex than any of the more common medicines. Although it really has but one action, the secondary effects as a result are complicated to the extreme. This one action is that of paralyzing the periphery of the nervous system, to which might be added: *especially of secretory nerves.* The sensory and motor also share in the depression, but not to the same extent as the secretory nerves. As a result of this depression the following phenomena is observed:

1. By depressing secretory nerves, the whole ærial mucosa is markedly desiccated. The extreme dryness of the throat in human patients is a manifestation of what belladonna does to the whole mucosa. The secretion of milk is greatly diminished, and in some cases entirely arrested. Sudation is greatly depressed or even suspended, and as a consequence the skin becomes dry. The intestinal secretions are only temporarily suspended, if at all. The action of belladonna on the intestinal secretions is not well demonstrated, but it is not disputed that the effect upon the intestinal secretion is less than upon other secretions. Its action upon the renal secretion is somewhat uncertain on account of the depressing action upon the sudoriparous glands. The function of the skin being suspended, belladonna may, as a result, actually increase the activity of the kidneys. On the salivary secretion the action is decided, the parotid and submaxillary glands sharing especially in the depression.

2. By paralyzing inhibitory nerves the heart's action is augmented. Both the number and force of the heart beats are increased, but more especially the former. This action of belladona is due to paralysis of the periphery of the vagus, which inhibits the heart's action. By paralyzing the periphery of the splanchnics, belladonna augments the intestinal activity, especially peristalsis, the intestinal secretion sharing slightly from this indirect stimulation. The first effect of the drug upon the secretion of the bowels, as already stated, is that of suppression, but later when the inhibitory nerves become depressed, the intestinal glands resume at least their normal activity.

3. By paralyzing motor nerves the voluntary muscles become paralyzed, but this effect is noticed only in the later stages of belladonna poisoning. In ordinary medicinal dosage

the effect on voluntary muscles may be said to be negative, but upon involuntary muscles, its action is marked; and upon this action the real value of belladonna as a curative agent largely depends. It paralyzes the vaso-motor constrictor nerves, especially of the capillary system, and so increases their lumen as to almost produce a pathological condition. The surface of the body becomes reddened and engorged with blood, and the mucous membranes are affected likewise. The organism is brought into a state that eminently resembles the first stage of a fever or an inflammatory disease, *i. e.*, augmented heart's action, with heat, redness, engorgement and dryness of the surface of the body. The capillaries of the lungs being similarly affected the respiratory area is increased. More blood is oxidized and more CO_2 is eliminated. With the heart stimulated into increased activity, the capillaries of the great respiratory area active and engorged, belladonna acts as a powerful stimulant to the respiratory function, a feature possessed by no other drug. The periphery of the third nerve is paralyzed and thus the elastic fibres of the iris contract and dilate the pupil. It was once said that atropine dilated the pupil by stimulating the sympathetic filaments of the iris, but as this theory has never been proven, and since it is difficult to conceive how a drug could depress one nerve and at the same time and under the same condition stimulate another, it is a statement that deserves no serious consideration. When the third nerve is cut the pupil dilates precisely as it does when paralyzed with atropine; therefore the mydriatic action of belladonna is easily comprehended.

4. By paralyzing sensory nerves belladonna becomes an analgesic, but in this connection it is inferior to opium. When applied locally in a more or less concentrated form it does relieve pain, but internally it does not rank high as a pain-killer. It does, however, have a soothing effect upon the urinary tract, and probably upon the generative organs.

Brain and spinal cord:—The only medicinal action that belladonna has upon the brain and spinal cord is its influence on the respiratory and vaso-motor centres.

Summary.

1. Belladonna is a cardiac stimulant, increasing particularly the number of heart beats.

2. It arrests secretions of the skin (antihidroic); the mucous membrane, especially the bronchial; the salivary glands (antisialagogue); and of the mammæ (antigalactagogue).

3. It does not have a marked effect on intestinal secretion, only temporarily suspending it.

4. It slightly augments peristalsis, but not sufficiently to warrant its use for this purpose.

5. It stimulates the respiratory function, and in fact increases the capacity of the lungs.

6. It dilates the pupil (mydriatic.)

7. Internally it has no marked effect on pain, except on the urino-generative tract, but ranks high as a local anodyne.

8. It dilates the capillaries and stimulates the action of the heart, and is therefore stimulant to the periphic circulation.

Therapeutics :—Belladonna has two general indications, viz., inflammation and passive hyperæmia. In any of the organic inflammatory diseases, or in any inflammatory condition, belladonna deserves to be considered in connection with their therapeutics. To say that belladonna is indicated in inflammation seems a very broad statement, and one which will probably be accepted unchallenged. But when the pathological process (inflammation) is carefully reviewed, and the total effects of the drug carefully weighed, the statement is not so ambiguous as it seemed without consideration.

The period of inflammation in which belladonna is useful, if not almost a curative agent, is the stage succeeding the stage of engorgement, *i. e.* the second or moist stage. Its tendency here is to correct the vascular alteration and to limit exudations, which in croupous, catarrhal, diphtheretic inflammation is precisely what is desired. To limit the exudations of bronchitis, laryngitis or pulmonitis, is no more nor less than decreasing the ravages of inflammation, especially in the latter, when the inflammatory exudates gradually close the respiratory tract, it is part of the great battle to combat them ; and besides, in this disease, that part of the lung that is not affected is rendered more capable of performing its function.

In these respiratory diseases, belladonna also possesses the property of preventing cough, which is caused by the inflammatory secretions, as well as the inflammation itself ; in the former by drying secretions, and in the latter by allaying the irritation. In pleuritis it should prevent hydro-thorax, although I cannot substantiate the statement from experience, as I have never administered it with this end in view.

In secondary nephritis occurring along the course of infectious diseases, especially when the condition has been aggravated by the liberal use of diuretics, belladonna has a beneficial

influence; and also in cases of metritis and cystitis. In these diseases belladonna and saw palmetto prescribed together, often give flattering results.

The organic diseases in which belladonna is especially valuable are: Croupous pneumonia, catarrhal pneumonia, bronchitis, laryngitis, nephritis, cystitis, mastitis and metritis. It is also of service in laminitis and enteritis, but no special claims can be made for it in these diseases.

In diseases of the eye or for making examinations of the posterior region of the globe, atropine at once commends itself, and when applied locally or internally it will dilate the pupil more than any other drug, and will in this way prevent the adhesion of the iris to the lens.

Contra-Indications :—Belladonna is strictly contra-indicated in active hyperæmia, and in the first stages of any inflammatory disease. Because of its antigalactogogue effect it should not be administered to mothers suckling their young, or to milking animals, unless its action is considered more important than the milk supply. In inflammatory diseases of the brain and spinal cord even small doses may cause delirium, and hence should be excluded from the therapy of these diseases. It has been prescribed in tetanus, but its value, to say the most, is doubtful.

Administration and Posology :—The doses of fluid extract should be about 15 grams every twenty-four hours. 1 gram doses every two hours, when given over a period of three or four days, is quite sufficient. In single the horse will take 8 grams, twice daily, but smaller and repeated doses give better results. Atropine, which should always be given hypodermically, may be given in .06 to .12 gram doses, twice daily.

Atropine hypodermically may be prescribed with strychnia (.06 grams of each). If given intratracheally, one-half the dose is sufficient, as atropine seems to increase the action of strychnia. I have noticed repeatedly that when these drugs are given together, even small doses will produce alarming symptoms of strychnia poisoning.

The fluid extract when given for pulmonary diseases may be combined with the fluid extract of nux vomica, and for renal or generative disorders, with saw palmetto and sanmetto. In hepatized lungs, ammonia muriate is a useful adjunct.

Belladonna is physiologically incompatible with pilocarpine, ammonia acetate, or any diaphoretic of the stimulating variety. On first notice it seems to be incompatible with opium, but this is not the case. Its action upon the respiration is exactly oppo-

site, but otherwise they do not antagonize each other. However, this is of no importance in veterinary practice, as there can be no urgent need of prescribing them together. It might be argued that since one is a centric and the other a periphic paralizant, that their union might be useful in depressing the whole nervous system in painful afflictions. However true this may be in human practice, experience will soon teach a veterinatian that belladonna in the horse is not noted for its analgesic properties.

In treatment of diseases of the eye, when dilatation of the pupil is desired, atropine in a one per cent. solution is dropped into the eye three or four times a day; and after the third or fourth application the result will be attained, and the pupil thus dilated may remain for several days, and in isolated cases for a week. On account of this feature homatropine has entirely supplanted atropine when dilatation is desired for ophthalmoscopic examinations. A one per cent. solution of homatropine hydrobromate will dilate the pupil in from one to two hours, and the effect will pass off quite as rapidly, thus entirely overcoming the disagreeable feature of prolonged blindness.

DISCUSSION AND OTHER PROCEEDINGS.

All were pleased and highly interested in Dr. Merillat's paper, which was discussed by Drs. Robertson, A. H. Baker, and Hughes.

Drs. Merillat and Robertson entered upon a lively and extended debate of numerous subjects from belladonna to electricity and palmistry.

President Hughes introduced Professor Mauerman, bacteriologist at Northwestern University, who spoke and showed slides of actinomycosis, which was brought about by the discussion of Dr. Fish's paper at the March meeting; at that time the percentage of tuberculosis of the udder was brought up, and many of the inspectors confessed they had failed to differentiate clinically between actinomycosis and tuberculosis, and as a result one of the udders in question was submitted to Dr. Mauerman, and on microscopical examination was found to be actinomycosis. After a highly interesting discussion it was resolved to adjourn.

JOS. B. CLANCY, *Secretary.*

VETERINARY MEDICAL ASSOCIATION OF NEW JERSEY.

The forty-sixth annual meeting was held at 882 Broad St., Newark, May 10th, 1900. Meeting called to order at 12

o'clock by the Secretary. Dr. W. Herbert Lowe was chosen temporary chairman. Roll-call showed 25 members present. Minutes of previous meeting read and approved. Dr. Lowe then resigned the chair to the President, Dr. Hurley, who had just arrived.

The Secretary then read letters from Dr. W. Horace Hoskins, Dr. Leonard Pearson, and Dr. R. C. Vail.

Dr. Budd moved a committee be appointed to see Congressman R. Wayne Parker and urge his support of the Army Veterinary Bill. The President appointed Drs. Budd, Harker and Runge.

Adjourned at 1 o'clock for dinner.

Reconvened at 2.15.

Dr. J. Payne Lowe read a paper on "Median Neurectomy"* and Dr. S. S. Treadwell read a paper on "Navicular Arthritis." Both papers were discussed at the same time.

Dr. James McDonough described contraction of the foot; its causes, consequences and treatment, and explained his subject by photographs. Dr. McDonough being an experienced shoer as well as veterinarian his remarks were very instructive.

The president appointed the following committee to revise the Constitution and By-Laws: Drs. Lowe, Glennon, Budd, Hasbrouck and Hurley.

Essayists for next meeting: Drs. Pape, Matthews, Sauter and Loblein.

Moved to meet at Atlantic City in September. Adjourned at 5.30 P. M.

S. LOCKWOOD, *Sec'y.*

AMERICAN VETERINARY MEDICAL ASSOCIATION.

Plans for the annual meeting in Detroit in September are rapidly maturing, and numerous letters received from members from all sections indicate a lively interest and a large attendance.

The following papers are already announced by Secretary Stewart:

"Psoropetes Communis Equi and Bovis, in Montana and N. W. Territory," by Dr. M. E. Knowles, State Veterinarian of Montana.

"Examination and Licensing of Stallions for Stud Purposes," by Dr. J. I. Gibson, State Veterinarian of Iowa.

"Remote Effects of Drugs," by Dr. L. A. Merillat, Professor of Therapeutics, McKillip Veterinary College.

* Will be published in the July REVIEW.

"Relation of Lymphatics to Meat Inspection," by Dr. Tait Butler, Inspector in Bureau of Animal Industry.

"Notes on the Tuberculin Test in Wisconsin," by Dr. G. Ed Leech, Assistant State Veterinarian of Wisconsin.

"Antiseptic Therapeutics," by Dr. J. F. Winchester, of Lawrence, Mass.

"Urinalysis in Veterinary Practice," by Dr. Pierre A. Fish, Professor of Physiology, New York State Veterinary College.

The titles to other papers will be announced in a short time.

The clinic promises to be a strong feature of the Detroit meeting. Antiseptic surgery will be demonstrated as fully as possible, and it is expected the clinics will include operations on the head and mouth, and the tail, as well as the several classic operations on the limbs.

Reduced rates have been granted by the railroads, and it now seems probable that a special excursion party can be arranged to go by boat from Buffalo to Detroit, as suggested in the REVIEW some months ago. This should prove an enjoyable arrangement for members East of that point.

MISSOURI VALLEY VETERINARY ASSOCIATION.

The twenty-third regular meeting was held in the Kansas City Veterinary College, Kansas City, Mo., on the evening of Feb. 19th, at 7.30. It was arranged to have a surgical clinic on the afternoon of the same day, but owing to the absence of subjects no clinic was held.

Owing to the absence of the President, Dr. Forbes, the meeting was called to order by the Second Vice-President, Dr. Schæffer, with the following officers, members, and visitors present: Drs. Schæffer, Wright, Milnes, Washburn, Bennet, Kaupp, Cooper, Buckley, Saunders, Moore and Stewart, with Drs. Falsetter and Knight (from Texas), George, Boise and Lawton, also Messrs. Lomax, Painter, Mahon, Lawrence, Starr, Kampochmidt, McFarland, Parker, Carswell, Burgett, Phillips, Moberly, Roach, Reber, Rice, Makins, Miller, Barnhart, Immerman, Crickett, Mooney, Biggs, and Halstead.

The minutes of the previous meeting were read and approved. The censors having reported favorably upon the application for membership of Albert Long, it was moved by Dr. Stewart that the rules be suspended and the Secretary instructed to cast the ballot for the association. Motion carried; the Secretary cast the ballot for the association and the candidate was duly elected.

The resignation of Frank C. McCurdy was read, and, on motion, was accepted. No other business on hand, the literary programme was then begun, which was as follows:

"In Breeding," by Dr. L. E. Bennet. Discussion led by Dr. Ross Cooper.

"Clippings from German Veterinary Journals," by Dr. Washburn. Discussion led by Dr. Stewart.

"Scientific Horseshoeing," by Dr. Chas. Saunders, with exhibition of specimen shoes.

All the papers brought forth a great deal of good and interesting discussion, and, especially, with the paper of Dr. Saunders; it was eagerly listened to and a great many new and valuable points were obtained. The specimen shoes Dr. Saunders had on exhibition were a rare treat to all who saw them.

After the literary programme, a vote of thanks was tendered the essayists of the evening for all their excellent papers. By vote, the society decided to meet in Saint Joseph in June.

JOHN B. WRIGHT, *Secretary.*

NEWS AND ITEMS.

DR. T. B. POTE, of Terre Haute, Ind., is now a member of the federal Meat Inspection force stationed at St. Louis, Mo.

LARGE numbers of horses have been bought by the English at Kansas City and sent to Africa by way of New Orleans.

DR. BENJ. F. PIERCE, of Springfield, Mass., sailed from New Orleans for South Africa with British horses on April 11.

THE MISSOURI VALLEY VETERINARY MEDICAL ASSOCIATION will hold its annual meeting in St. Joseph, June 25th.

DR. H. G. PATTERSON, class of 1899, of the Kansas City Veterinary College, has been appointed Assistant State Veterinarian at St. Joseph, Mo.

THERE are 24 veterinarians engaged in the U. S. Meat Inspection service in Kansas City, 12 in St. Joseph, and 4 in St. Louis, Missouri.

DR. J. PAYNE LOWE, of Passaic, N. J., in a private letter dated May 10, says: "The outlook is very bright for associational work in our State now, as we have a membership composed of representative men who are aroused to action."

DR. W. H. MEADORS, graduate of the Kansas City Veterinary College, class of 1900, who has for the past month been inspecting horses and mules for the British government in Kansas City, has been transferred to Texas.

DR. W. N. D. BIRD, formerly stationed at Nashville, Tenn., in the Texas fever quarantine service, has been transferred to Buffalo. This will be a pleasant arrangement for the Doctor, as his old home is not far from that city.

"I HAVE been a constant reader of the REVIEW for a long time, and cannot get along without it. I always look forward to its coming with a great deal of pleasure."—*A. O. Kennedy, V. S., Columbia, Tenn.*

DR. CHAS. H. HIGGINS, veterinary pathologist for the Canadian Government, is now stationed at William Head, Victoria, B. C., to aid in the inspection of emigrants, and prevent the introduction of "bubonic plague" into Canada through the Pacific gateway.

DR. H. G. PATTERSON, of St. Joseph, Mo.; Dr. H. G. Simpson, of Denison, Iowa: Dr. D. G. Moberly, of Kansas City, Mo., are among the number of veterinarians the English Government has employed to accompany and care for horses shipped from New Orleans to South Africa.

DR. CHARLES A. MACKEY, V. S., of New York City, died at his residence in that city, the latter part of April, from disease of the liver. He was a graduate of the New York College of Veterinary Surgeons, class of 1889, and was one of the veterinarians of the Police Department at the time of his death.

ABOUT 1200 horses are purchased and exported from the Buffalo horse market each month. The prices of horses have advanced fully 25 per cent. in the last few months, due to the scarcity of horses throughout this country, and the demand for the American horse abroad.

APPRECIATES THE REVIEW.—Enclosed please find money order for $3.00 in payment for Vol. XXIV of the REVIEW. I appreciate the monthly highly, and, aside from the fact that I know that I am getting full value, I think it every veterinarian's duty and *his best policy* to help to support and encourage the publication of an organ devoted entirely to the publishing of news and facts affecting the welfare of the profession and the dissemination of advanced theories, discoveries and scientific researches relating to Veterinary Science, which in my opinion will be the chief factor in future Sanitary Medicine, so rapidly gaining in importance.—*J. V. Laddey, D. V. S., Arlington, N. J.*

INSURANCE AGAINST TUBERCULOSIS.—An up-to-date experiment is being tried by the dairymen who supply milk to Minneapolis. These dairymen have formed a mutual insurance

company, insuring all of their cows for $25 each, and the premium is only ten cents per cow per year. The insurance is against the cows being condemned to death on account of tuberculosis by the State Board of Health. All cows giving milk that is sold in Minneapolis are eligible to insurance, and no other cause of death is recognized, the order for destruction signed by the proper official being necessary before the $25 will be paid. The amount may not be large, but $25 and the hide are a whole lot better than the hide alone to show for a cow.—(*Breeder's Gazette.*)

SANMETTO IN GENITO-URINARY TROUBLES OF THE HORSE AND DOG.—"I have used an excellent remedy, Sanmetto, in cystitic, impotency and chronic nephritis; also hæmaturia, and in all genito-urinary troubles in a dog, in teaspoonful doses, with the most satisfactory results. I have used one dozen bottles of Sanmetto this spring, on that number of horses, suffering with that most dreaded disease, azoturia, in ℥ ss doses, every four hours, in water q. s. Oss. They all got well except one, and she died in two hours after I saw her. All were down except one. I consider Sanmetto the best of any medicine I have ever used in those troubles, and shall continue to use it, and recommend it to all, for Sanmetto is a grand remedy."—*D. J. Smith, V. S.* (*Graduate of Ontario Veterinary College*), *Barre, Vermont.*

GOVERNMENT VETERINARIANS AT BUFFALO.—The following veterinarians are now engaged in the Federal Meat Inspection service at Buffalo, N. Y.: Dr. Chas. H. Zink, Inspector in charge of the station; Dr. B. P. Wende looks after the inspection of cattle in the New York Central Stock Yards, and all cattle imported from Canada, while in the same yards Dr. John P. O'Leary attends to the sheep interest and the dipping of the same. Dr. L. A. Robinson ably looks after the hog yards, and has become an expert in the detection of the diseases that hog flesh is heir to, while all horses intended for export must pass the inspection of Dr. H. M. Ball. At Abattoir No. 42, Dr. John H. McNeil ably looks after the post-mortem work on cattle and sheep. Dr. W. N. D. Bird attends to similar duties in the hog room. Dr. A. F. Martins has charge of the microscopic inspection force. Dr. H. R. Ryder looks after the calves and sheep that are slaughtered at Abattoir No. 190.

PASSING OF THE AUTOMOBILE.—The ultra-automobile dailies, of which the New York *Herald was* easily the leader, are gradually finding out the error into which they so precipit-

ously plunged in persistently claiming the advent of motor vehicles and the decadence of the horse. The journal mentioned has abandoned its crusade against the light harness horse, and even pitches into the cynics who dared to insinuate that his popularity was waning. Its account of the recent grand New York Speedway parade of road horses was the most flattering testimonial that we have ever seen recorded by the best friends the horse ever had, and his future is pictured in the most roseate terms. Having become convinced by ocular demonstration that the inanimate machine can have but little part in man's pursuit of pleasure, if will require but a few months more to bring forth a similar declaration with regard to family equipages for convenience, style, and pleasure, while only a little longer time will be necessary to show the fanatics that for business or any other purpose the horse is cheaper, better, and more reliable than any other motive power, and the love of the masses for his beauty and faithfulness will ever keep him installed in the high place that has been his since the beginning of time.

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HORSE AMBULANCE FOR SALE.
The widow of the late Dr. Wm. H. Harbaugh, of Richmond, Va., wishes to dispose of his ambulance, which he had specially built and used but a short time before his death, it being now practically as good as new. Any one wishing such a desirable addition to his hospital will do well to address MRS. SALLIE I. HARBAUGH, Fairmount, Richmond, Va.

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